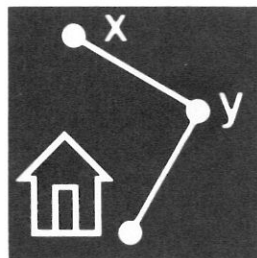# The Problem Solver 4

Activities for Learning Problem-Solving Strategies

Judy Goodnow
Shirley Hoogeboom
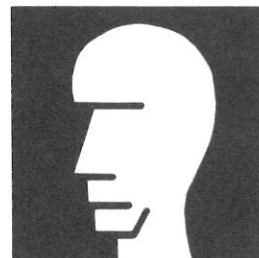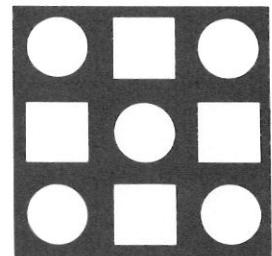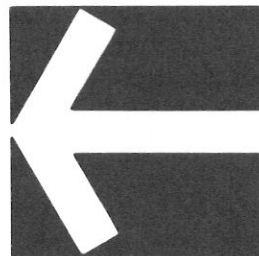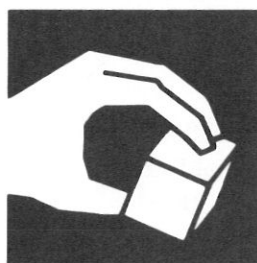
TITLE I

Illustrated by Elaine Abe
Cover design by JoAnne Hammer
Graphic symbols by Steve Reiling

Contents

Problems	Pages	Strategy Focus
1, 2	T•1 – T•4	Use logical reasoning
3, 4	T•5 – T•8	Make an organized list
5, 6	T•9 – T•12	Use or make a table
7, 8	T•13 – T•16	Make an organized list
9, 10	T•17 – T•20	Make a picture or diagram
11, 12	T•21 – T•24	Make an organized list
13, 14	T•25 – T•28	Guess and check
15, 16	T•29 – T•32	Act out or use objects
17, 18	T•33 – T•36	Make a picture or diagram
19, 20	T•37 – T•40	Use or make a table
21, 22	T•41 – T•44	Use or look for a pattern
23, 24	T•45 – T•48	Act out or use objects
25, 26	T•49 – T•52	Use or look for a pattern
27, 28	T•53 – T•56	Use or make a table
29, 30	T•57 – T•60	Work backwards
31, 32	T•61 – T•64	Make a picture or diagram

Problem	Page	Similar Teaching Problems		Problem	Page	Similar Teaching Problems	
87	P•20	33,	34	104	P•28	45,	46
88	P•20	35,	36	105	P•29	31,	32
89	P•21	5,	6	106	P•29	39,	40
90	P•21	41,	42	107	P•30	43,	44
91	P•22	1,	2	108	P•30	47,	48
92	P•22	15,	16	109	P•31	21,	22
93	P•23	3,	4	110	P•31	11,	12
94	P•23	9,	10	111	P•32	27,	28
95	P•24	13,	14	112	P•32	31,	32
96	P•24	19,	20	113	P•33	35,	36
97	P•25	23,	24	114	P•33	47,	48
98	P•25	7,	8	115	P•34	45,	46
99	P•26	17,	18	116	P•34	43,	44
100	P•26	25,	26	117	P•35	41,	42
101	P•27	33,	34	118	P•35	37,	38
102	P•27	37,	38	119	P•36	39,	40
103	P•28	41,	42	120	P•36	47,	48

THE PROBLEM SOLVER PROGRAM

The Problem Solver is a step-by-step instructional program designed to help your students become competent and confident problem solvers. It utilizes an easy-to-learn, four-step method combined with ten useful problem-solving strategies. A wide range of reproducible problems are carefully sequenced to systematically expand your students' problem-solving abilities.

CONTENTS AND ORGANIZATION OF *THE PROBLEM SOLVER 4*

Section 1: Teaching the Strategies

The first part of this section describes the four-step method and the ten solution strategies. Sample problems are used to illustrate how the method and strategies can be implemented.

The second part of this section presents 48 teaching problems. For each problem there is a reproducible student page and a one-page teaching plan. The problems are organized in groups of two that focus on the same strategy. The symbol of that strategy is shown in the upper left-hand corner of both the student page and the teaching plan page. All ten strategy symbols are shown on the student page in the Choose A Strategy section. Encourage students to circle the strategy or strategies they use.

Section 2: Practice Problems

This section presents 72 reproducible problems similar to those in Section 1. But here, no strategies are recommended. The students must decide which strategy to use. There are two problems on a page and they have purposely been mixed up so that they do not follow the order of strategies presented in the teaching section. A reproducible recording sheet is provided for students to use with each problem. The ten strategy symbols are shown on the recording sheet. The students circle the appropriate symbol or symbols to indicate which strategy or strategies they used.

Section 3: Solutions

Here you will find a solution for every problem in Sections 1 and 2. For many problems, notes are also included describing the solution process. (Solutions for all the problems in Section 1 are also shown on their respective teaching plan pages.)

GENERAL TEACHING SUGGESTIONS

Presenting the Problems

Before you present any problems to the students, read through the descriptions of the four-step method and the ten solution strategies in Section 1. We recommend that you present the problems in the order they appear. The problems have been carefully sequenced so that they progress from easy to more challenging. The math skills required to solve even the most challenging problems are those which children have usually mastered by the middle of fourth grade.

Give the student a copy of the problem and a copy of the recording sheet. You may also want to give them calculators to use. Read the problem aloud to the students. Encourage the students to verbalize their thought processes as they choose strategies and find solutions. Develop an atmosphere in which the students feel comfortable expressing themselves. Let them know it's okay to make mistakes. In this setting, your students will become enthusiastic problem solvers and will begin to see problems as interesting challenges.

Use the teaching plans. The sequence of questions in each plan guides the students through the four-step method: FIND OUT, CHOOSE A STRATEGY, SOLVE IT, and LOOK BACK. You'll probably want to add some of your own questions to further clarify the process. The responses to the questions, shown in italics in the teaching plans, are only samples of the kinds of responses you want to draw from your students. Encourage them to risk giving incorrect answers. Remember, it is more important for them to take an active role in solving the problem, and enjoy doing it, than it is to respond with the right answer.

Since students learn in different ways, some students may wish to use a strategy other than the focus strategy for solving a problem given in Section 1. Encourage students to use methods that are best for them, when they can demonstrate a legitimate solution process with another strategy. (The goal is to equip your students with techniques for approaching future problems, but you also want them to be flexible in applying them.) Some students may even discover additional strategies and use them to solve the problems. Encourage the students to design new symbols for those strategies.

Additional Practice

For additional practice, you can give students the problem extensions which appear on many teaching plans in Section 1, and practice problems from Section 2. Since a problem extension restates a given problem with different data or a different question, you may wish to have students solve it immediately after solving the original problem. Each practice problem is similar to a group of two problems in Section 1. When students have solved both problems in that group, you can give them a similar practice problem from Section 2. However, you may wish to wait until the students have solved several groups of problems using different strategies before giving them the practice problems. That will make choosing a strategy more of a challenge.

The table below lists problems in *The Problem Solver 3* and *The Problem Solver 5* which are similar to the problems in *The Problem Solver 4*. The problems for third grade are less difficult and can be used with all students. The problems for fifth grade are more challenging and can be used with students that are ready to go on.

The Problem Solver 4		Similar Problems in	
		The Problem Solver 3	*The Problem Solver 5*
Problems	**Strategy Focus**	**Problems**	
1, 2	Use logical reasoning	1, 2, 55, 81, 94	
3, 4	Make an organized list	3, 4, 58, 79, 101	
5, 6	Use or make a table	5, 6, 53, 80, 104	
7, 8	Make an organized list	7, 8, 49, 67, 92	7, 8, 56, 82, 105
9, 10	Make a picture or diagram	9, 10, 56, 82, 117	
11, 12	Make an organized list	11, 12, 72, 96, 118	3, 4, 49, 75, 99
13, 14	Guess and check	13, 14, 66, 102, 116	15, 16, 54, 80, 100
15, 16	Act out or use objects	15, 16, 51, 75, 100	5, 6, 50, 78, 102
17, 18	Make a picture or diagram	17, 18, 65, 90, 112	13, 14, 52, 77, 101
19, 20	Use or make a table	19, 20, 68, 95, 119	
21, 22	Use or look for a pattern	21, 22, 51, 89, 113	9, 10, 53, 73, 97
23, 24	Act out or use objects	23, 24, 57, 91, 115	
25, 26	Use or look for a pattern	25, 26, 61, 78, 120	
27, 28	Use or make a table	27, 28, 50, 60, 70	11, 12, 59, 85, 108
29, 30	Work backwards	29, 30, 54, 64, 86	43, 44, 69, 86, 118
31, 32	Make a picture or diagram	31, 32, 69, 76, 88	19, 20, 57, 83, 98
33, 34	Use logical reasoning	33, 34, 62, 77, 114	
35, 36	Make an organized list	35, 36, 74, 85, 111	27, 28, 58, 84, 91
37, 38	Use or look for a pattern	37, 38, 84, 98, 107	
39, 40	Use logical reasoning	39, 40, 73, 106, 109	35, 36, 65, 92, 115
41, 42	Guess and check	41, 42, 59, 83, 93	29, 30, 61, 96, 113
43, 44	Work backwards	43, 44, 63, 87, 110	
45, 46	Make it simpler	45, 46, 97, 103, 108	45, 46, 72, 76, 117
47, 48	Brainstorm	47, 48, 71, 99, 105	47, 48, 71, 87, 120

If you wish to provide more practice for your students, the following books on problem solving are available from Creative Publications:

Think About it! Mathematic Activities of the Day   *Trivia Math: A Problem A Day*
Thinker Tasks: Critical Thinking Activities   *Problem Solver Projects, Grade 4*

TEACHING THE STRATEGIES

Part one of this section describes the four-step method and the ten solution strategies. Sample problems are used as examples to illustrate how the method and strategies can be implemented. Part two presents 48 teaching problems. For each problem there is a reproducible student page and a one-page teaching plan. The problems are organized in groups of two that focus on the same strategy. The symbol of that strategy is shown in the upper left-hand corner of both the student page and the teaching plan page. Please see pages vii – viii for some general teaching suggestions in presenting the problems to your students.

What Is the Four-Step Method?

The four-step method is a systematic approach to problem solving that can be used for solving any problem.

The first step is to FIND OUT what the problem means and what question you must answer to solve it. To find out what the problem means, you must understand the words and phrases used and what's happening in the problem. You must be able to identify the important information and the unimportant information, and determine if any necessary information is missing and what you must do to get that information. In some cases, the problem may need to be broken up into smaller problems before the larger problem can be solved. You should understand the problem well enough to say it in your own words. And finally, you must be able to state the question you have to answer to solve it.

The second step is to CHOOSE A STRATEGY that will help solve the problem. You will often find there is more than one strategy that can be used. The idea, however, is to find the strategy or strategies that will help you the most with a particular problem.

The third step is to SOLVE IT. Work through the problem until you find the answer to the question, using the strategy you selected. It is important that you record your work in a way that lets you see at a glance what you've completed. As you work to find the answer, you may find that the strategy you selected is not as helpful as you thought it might be. In that case, you will want to try a different strategy.

The fourth step is to LOOK BACK. Reread the problem and check the solution to see that it meets the conditions stated in the problem and that it answers the question. To review your solution and ask yourself if it's logical and reasonable is a very important step in problem solving.

ACT OUT THE PROBLEM OR USE OBJECTS

Some students may find it helpful to act out a problem or to move objects around while they are trying to solve a problem. It allows them to develop visual images of both the data in the problem and the solution process. By taking an active role in finding the solution, students are more likely to remember the process they used and be able to use it again for solving similar problems. The dramatizations and objects need not be elaborate: small scraps of paper and colored chips or counters will usually work quite well. This strategy is especially helpful when the problem solver wants to visualize relationships. For example:

Problem 15: Donna was putting six new bears in the display case at the toy store. The case had three shelves, one on top of the other, with two spaces on each shelf. Each bear had a name: Abby, Bobby, Cathy, Dorothy, Eric, and Forrest. Donna put Dorothy next to Eric and above Forrest. She did not put Bobby next to Eric or Forrest. She did not put Abby next to Bobby. Where did Donna put each of the bears?

Solution:

Cathy	Bobby
Eric	Dorothy
Abby	Forrest

MAKE A PICTURE OR DIAGRAM

For some children, it may be helpful to use an available picture or make a picture or diagram when trying to solve a problem. The pictures or diagrams need not be well drawn. It is most important that they help the problem solver understand and manipulate the data in the problem. Using diagrams is almost a necessity for some problems, particularly those which involve mapping. For example:

Problem 9: The kitten climbed its first tree and got stuck on the top branch. First it went up the trunk of the tree and on up to the 6th branch. A big squirrel scared the kitten and it climbed down 3 branches. A bird flew at the kitten and scared it again. Now it climbed up 10 branches. The kitten climbed back down 2 branches and then went up 4 branches to the very top of the tree. How many branches were in the tree?
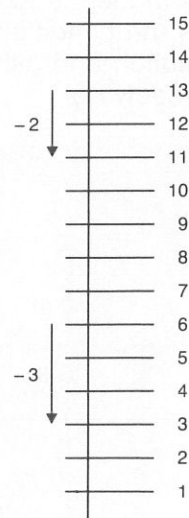
Solution: 15

USE OR MAKE A TABLE

A table is an orderly arrangement of data, such as numbers. Problem solvers find that making tables helps them keep track of data, spot missing data, and identify data that is asked for in the problem. Because patterns often become obvious when data is organized in a table, this strategy is often used in conjunction with other strategies. In the example below, the table is used to keep track of data and could also be used for identifying a number pattern.

Problem 19: Melody and Mandy are circus elephants. They always lead the circus parade. Melody is 4 years old and Mandy is 13 years old. When will Mandy be twice as old as Melody?

Solution: 5 years (Mandy 18, Melody 9)

Melody	4	5	6	7	8	9
Mandy	13	14	15	16	17	18

MAKE AN ORGANIZED LIST

Making an organized list helps problem solvers organize their thinking about a problem. Recording work in an organized list makes it easy to review what has been done and to identify important steps that must yet be completed. It also provides a systematic way of recording computations made with given data or recording combinations of given items. For example:

Problem 35: Big Burger is giving away gold and silver coupons. The gold coupons are worth 15 points and the silver coupons are worth 10 points. Owen is saving coupons so he can get free Super-Big Burgers. So far Owen has 16 coupons worth 215 points. How many gold coupons and how many silver coupons does Owen have?

Solution: Eleven 15-point, five 10-point

| 15 point	10 point
1—15	1—10
2—30	2—20
3—45	3—30
4—60	4—40
5—75	5—50
6—90	6—60
7—105	7—70
8—120	8—80
9—135	9—90
10—150	10—100
11—165	11—110

☑ GUESS AND CHECK

Guessing and checking is helpful when a problem presents large numbers or many pieces of data, or when the problem asks the solver to find one solution but not all possible solutions to a problem. When problem solvers use this strategy, they guess the answer, test to see if it is correct, and make another guess if the previous one was incorrect. In this way, they gradually come closer and closer to a solution by making increasingly more reasonable guesses. Problem solvers can also use this strategy to get started, and may then find another strategy which can be used. Guessing and checking is particularly helpful when a problem presents so many pieces of data that making an organized list becomes a major task. For example:

Problem 13: Monica and Marty are llamas at the petting zoo. They like to count their visitors, and the number of people who pet them. After visiting hours on Sunday Monica reported that 105 people in all had petted both of them. She bragged that $2\frac{1}{2}$ times as many people petted her as petted Marty. How many people petted Monica and how many petted Marty?

Solution: Monica = 75, Marty = 30
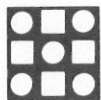
⬛ USE OR LOOK FOR A PATTERN

A pattern is a regular, systematic repetition. A pattern may be numerical, visual, or behavioral. By identifying the pattern, the problem solver can predict what will "come next" and what will happen again and again in the same way. Looking for patterns is a very important strategy for problem solving, and is used to solve many different kinds of problems. Sometimes students can solve a problem just by recognizing a pattern, but often they will have to extend a pattern to find a solution. Making a number table often reveals patterns, and for this reason is frequently used in conjunction with the "look for a pattern" strategy. For example:

Problem 21: "The Monsters of Muzz" opened on Monday. The first day there were 25 people who saw the movie. Word got out and on the second day 17 more people came than on the first day, so that 67 people had seen the movie after the second day. On the third day 59 people came, 17 more than on the second day. If each day 17 more people saw the movie than the day before, on what day would 500 people have seen the movie?

Solution: 7

Day	1	2	3	4	5	6	7
Number for Day	25	42	59	76	93	110	127
Total	25	67	126	202	295	405	532

⮕ WORK BACKWARDS

To solve certain problems, the problem solver must make a series of computations, starting with data presented at the end of the problem and ending with data presented at the beginning of the problem. For example:

Problem 29: Heidi and Cathleen were trying to decide what kind of pet they wanted. They looked at a lot of animals at Morgan's Pet Store. They looked at 3 more rabbits than birds. They saw one half as many birds as kittens. There were one third as many kittens as puppies. They took a long look at the 36 adorable puppies. How many animals did they look at altogether?

Solution: 63

$$
\begin{array}{r}
36 \text{ puppies} \\
\tfrac{1}{3} \text{ kittens} = 12 \\
\tfrac{1}{2} \text{ birds} = 6 \\
3 \text{ more rabbits} = 9 \\
\hline
\text{Total} = 63
\end{array}
$$

👤 USE LOGICAL REASONING

Logical reasoning is really used for all problem solving. However, there are types of problems that include or imply various conditional statements such as: "if . . . then," or "if . . . then . . . else," or "if something is true, then . . ." or "if something is not true, then . . . ." The data given in the problems can often be displayed in a chart or matrix. This kind of problem requires formal logical reasoning as the problem solver steps his or her way through the statements given in the problem. For example:

Problem 39: Amelia, Gigi, Evan, and Collin were dreaming about being an animal trainer, a clown, a juggler, and a trapeze artist in the circus. Gigi is training her dog to be a seeing-eye dog for the blind. Evan is always telling jokes, and Amelia is afraid of heights. Which job in the circus do you think Amelia, Gigi, Evan, and Collin would choose?

Solution: Gigi - animal trainer, Evan - clown, Amelia - juggler, Collin - trapeze artist

	Gigi	Evan	Amelia	Collin
animal trainer	Y	N	N	N
juggler	N	N	Y	N
clown	N	Y	N	N
trapeze artist	N	N	N	Y
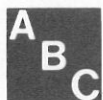
A B C MAKE IT SIMPLER

Students will find it helpful to be able to make problems simpler, especially when they begin to solve complex problems. Making a problem simpler may mean reducing large numbers to small numbers, or reducing the number of items given in a problem. The simpler representation of the problem, then, may suggest what operation or process can be used to solve the more complex problem. The simpler representation may even reveal a pattern which can be used to solve the problem. For example:

Problem 45: Several soccer teams are having an end-of-the-season soccer party. The team captains are putting square tables together in a long row for the party. They can put two chairs on each side of a table. The tables are all the same size. If they put together ten tables in a row, how many people can sit down?

Solution: 44		
	1 = 8	6 = 28
	2 = 12	7 = 32
	3 = 16	8 = 36
	4 = 20	9 = 40
	5 = 24	10 = 44

BRAINSTORM

This strategy is often used when all else fails. When the problem solver cannot think of a similar problem that he or she has solved before, and cannot think of another strategy to use, brainstorming is a good strategy to try. Brainstorming means looking at a problem in new and inventive ways. There are always problems that stretch people beyond their experience and expertise. When students encounter problems that they cannot solve, they must be encouraged to open up, stretch, allow for inspiration, be creative, be flexible, and keep on trying until a light goes on! For example:

Problem 47: Which is better, a new $5 bill or an old one?   Solution: $5 is always better than $1

How Can You Teach the Four-Step Method and Solution Strategies?

Use the teaching plans. Read the problem aloud. Then begin the sequence of questions given in the teaching plan for the problem. Name each step as you begin it. Encourage the students to exchange a variety of ideas and opinions after each question is raised. The questions will lead the students through the four steps and serve as a model for them to follow when they must develop their own questions for solving later problems. The four-step method is illustrated below by the teaching plan for problem 13. Italicized responses following the questions are examples of the kinds of responses you want to elicit from students.

GUESS AND CHECK   Teaching Plan

13 Monica and Marty are llamas at the petting zoo. They like to count their visitors, and the number of people who pet them. After visiting hours on Sunday Monica reported that 105 people in all had petted both of them. She bragged that $2\frac{1}{2}$ times as many people petted her as petted Marty. How many people petted Monica and how many petted Marty?

FIND OUT
- What is the question you have to answer? *How many people petted Monica and how many petted Marty?*
- What do Monica and Marty like to do? *Count the number of people who pet them*
- What is the total number of people who petted Monica and Marty on Sunday? *105*
- What do you know about the number of people who petted Monica? *$2\frac{1}{2}$ as many as petted Marty*
- What do you know about the number of people who petted Marty? *Only that it is less than Monica*

CHOOSE A STRATEGY
- If you don't have much information, would it help to make a guess? *Yes*
- The symbol at the top of the page means that you can make a guess and then check it, to help solve the problem. If your guess is wrong, you can use the information to help you make another guess.

SOLVE IT
- (Following is just an example of one sequence of answers based on one possible guess.)
- Which llama do you want to make a guess for? *Marty* Why? *Because we have no information about Marty, and with a guess for Marty we can figure out a number for Monica.*
- What is your guess? *50 for Marty*
- With a guess for one llama, how can you find a number for the other llama? *We know that Monica is $2\frac{1}{2}$ times Marty, so we can just multiply $2\frac{1}{2}$ times 50 = 125*
- How can you check your guess? *Add the 125 and 50 and compare the total with 105*
- How was your guess? *Off by 70* If your first guess was wrong, how can you make your second guess better? *If the first guess was too high by 70, then we should make the guess for Marty lower.*

Solution: Monica = 75, Marty = 30

LOOK BACK
- Read the problem again. Look at the information given and the main question. Review your work. Is your answer reasonable?

EXTEND IT
- Another Sunday Marty reported that a total of 200 people petted them both and this time $2\frac{1}{3}$ as many people petted him as petted Monica. How many people petted Marty and how many petted Monica?

When you have completed the four steps with the students, you can give them the problem extension to solve as further practice.

After your students have solved one or more groups of two problems, you can give them similar practice problems from Section 2. The practice problems related to a given group are identified in the teaching plan for the second problem in that group.

Recording Sheet

Name

Problem Number _____

FIND OUT
- What is the question you have to answer?
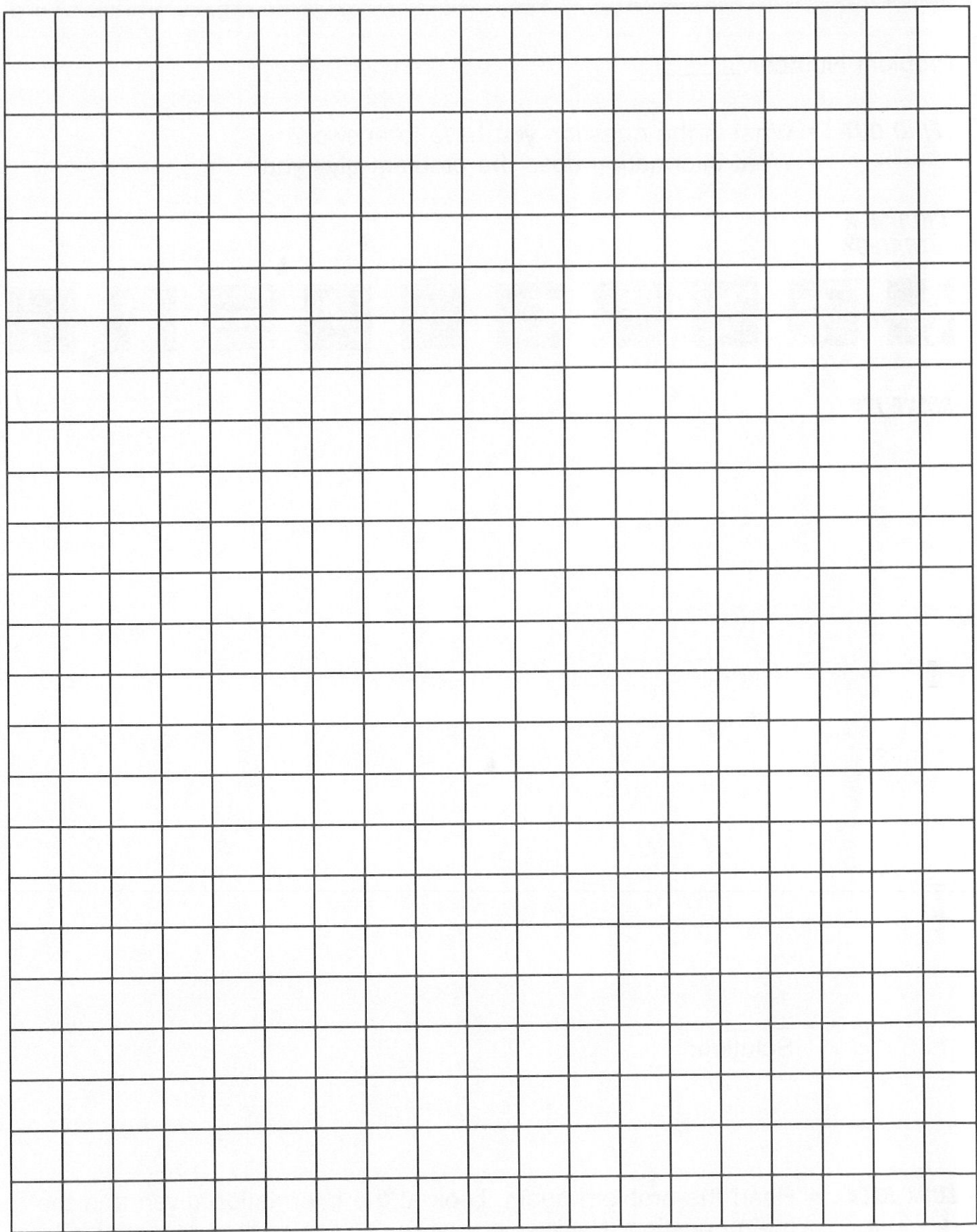- What information does the problem give you?

CHOOSE A STRATEGY

SOLVE IT

Solution:

LOOK BACK
- Read the problem again. Look at the information given and the main question. Review your work. Is your answer reasonable?

T•x

1 Monster Masks Galore has masks all over the walls. Each monster mask has a number. Shiela is trying to decide between masks 7, 9, 12, 15, and 25.

- Monster masks 7 and 9 have smiling faces.
- Monster masks 7 and 25 have pointed ears.
- Monster mask 15 has freckles.

Can you put a number with each mask below?
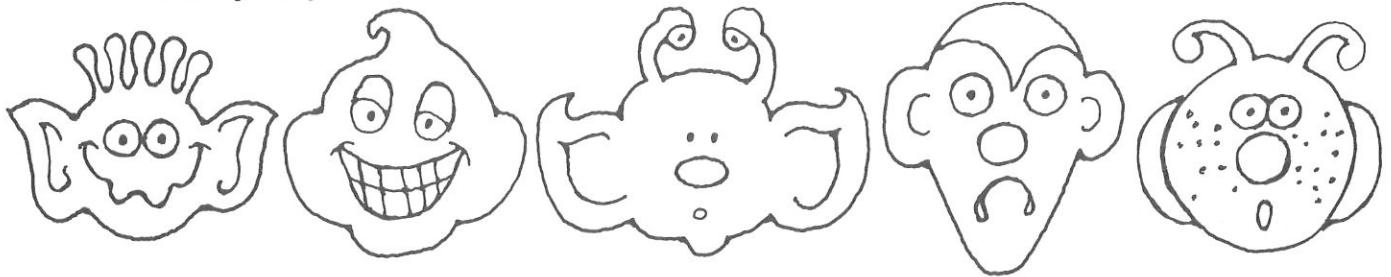
FIND OUT
- What is the question you have to answer?
- What is one thing you know about mask 7? What else do you know about mask 7?
- What do you know about mask 9?
- What do you know about mask 25?
- What do you know about mask 15?

CHOOSE A STRATEGY
- Circle to show what you choose.

SOLVE IT
- What is one thing you know about mask 7? What else do you know about 7? Is there another mask like this? Then do you know which mask has to be 7?
- What do you know about mask 9? Is there another mask like this, or do you already know the number of the other mask?
- What do you know about mask 25? Is there another mask like this, or do you already know the number of the other mask?
- What do you know about mask 15? Is there another mask like this?
- Which mask is left? If that is the only mask left, then what number is it?

LOOK BACK
- Read the problem again. Look at the information given and the main question. Review your work. Is your answer reasonable?

The Problem Solver 4   T•1   © 1987 Creative Publications
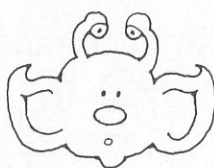
1 Monster Masks Galore has masks all over the walls. Each monster mask has a number. Shiela is trying to decide between masks 7, 9, 12, 15, and 25.

- Monster masks 7 and 9 have smiling faces.
- Monster masks 7 and 25 have pointed ears.
- Monster mask 15 has freckles.

Can you put a number with each mask below?

FIND OUT
- What is the question you have to answer? *Can you put a number with each mask?*
- What is one thing you know about mask 7? *It has a smiling face.* What else do you know about mask 7? *It has pointed ears.*
- What do you know about mask 9? *It has a smiling face.*
- What do you know about mask 25? *It has pointed ears.*
- What do you know about mask 15? *It has freckles.*

CHOOSE A STRATEGY
- The symbol at the top of your sheet means that you use a special kind of thinking called "logical reasoning." We can use statements that say if something is true or false, then something else must be true or false. Let's try this kind of thinking together.

SOLVE IT
- What is one thing you know about mask 7? *It has a smiling face.* What else do you know about 7? *It has pointed ears.* Is there another mask like this? *No, masks 9 and 25 both have one of the things.* Then do you know which mask has to be 7? *Yes*
- What do you know about mask 9? *It has a smiling face.* Is there another mask like this, or do you already know the number of the other mask? *Mask 7 has a smiling face too, but we already know which one that is. So the other mask with the smiling face must be 9.*
- What do you know about mask 25? *It has pointed ears.* Is there another mask like this, or do you already know the number of the other mask? *Mask 7 has pointed ears too, but we know which one that is. So we know which mask is 25.*
- What do you know about mask 15? *It has freckles.* Is there another mask like this? *It is the only one.*
- Which mask is left? *There is only one left.* If that is the only mask left, then what number is it? *It has to be 12.*

Solution:
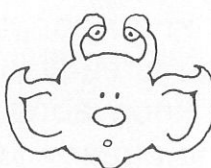
| 7 | 9 | 25 | 12 | 15 |

LOOK BACK
- Read the problem again. Look at the information given and the main question. Review your work. Is your answer reasonable?

EXTEND IT
- Can you make up a problem like this?

2 Robots for Rent is presenting six new kinds of robots. The names of the six new kinds are: Randy, Robert, Rachel, Ramona, Rhonda, and Rollie.

- Randy and Robert do not have square control panels.
- Robert and Rachel do not have a nose or mouth.
- Ramona and Rollie have arms.
- Rollie has square eyes.

Can you put a name by each of the robots?
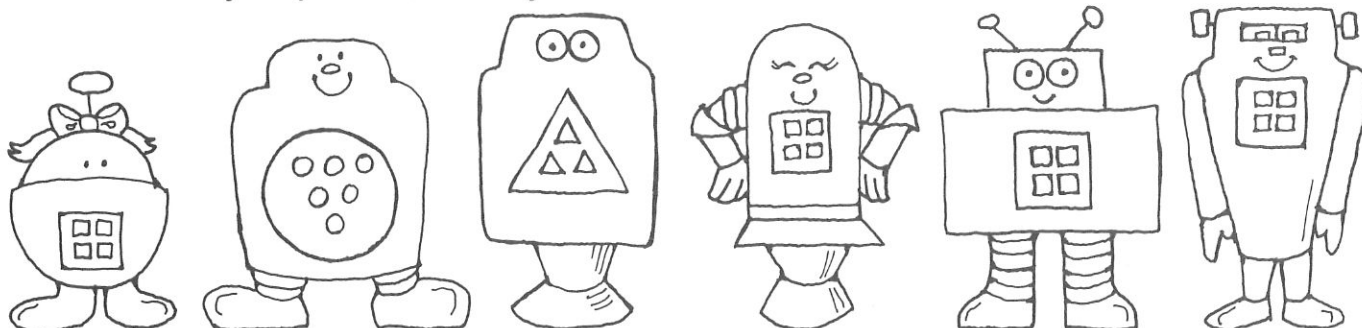
FIND OUT
- What is the question you have to answer?
- What do you know about Robert? Randy? Rachel? Rollie? Ramona?

CHOOSE A STRATEGY
- Circle to show what you choose.

SOLVE IT
- What is one thing you know about Robert? What else do you know about him? Is there another robot like this? Then do you know which robot is Robert?
- What do you know about Randy? Is there another robot like this, or do you already know which robot that is? Then is there one robot that has to be Randy?
- What do you know about Rachel? Is there another robot like this, or do you know which robot that is? Then is there one robot that has to be Rachel?
- What is one thing you know about Rollie? What else do you know about him? Is there another robot like this?
- What do you know about Ramona? Is there another robot like this, or do you already know which robot that is? Then is there one robot that has to be Ramona?

LOOK BACK
- Read the problem again. Look at the information given and the main question. Review your work. Is your answer reasonable?

2 Robots for Rent is presenting six new kinds of robots. The names of the six new kinds are: Randy, Robert, Rachel, Ramona, Rhonda, and Rollie.

- Randy and Robert do not have square control panels.
- Robert and Rachel do not have a nose or mouth.
- Ramona and Rollie have arms.
- Rollie has square eyes.

Can you put a name by each of the robots?
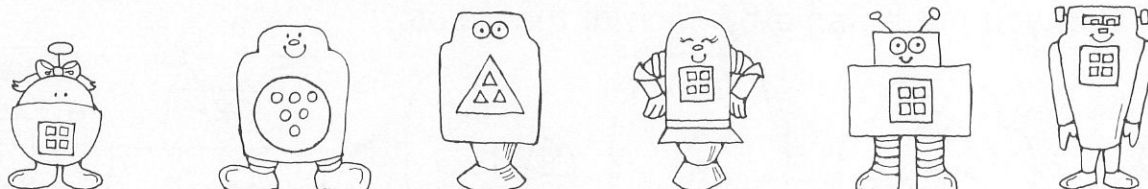
FIND OUT
- What is the question you have to answer? *Can you put a name by each robot?*
- What do you know about Robert? *He does not have a square control panel. He does not have a nose or mouth.* Randy? *He does not have a square control panel.* Rachel? *She does not have a nose or mouth.* Rollie? *He has arms. He has square eyes.* Ramona? *She has arms.*

CHOOSE A STRATEGY
- The symbol at the top of your sheet means that we use "logical thinking." We can use the kind of statements that say if something is true or false then something else must be true or false. Let's try this thinking together.

SOLVE IT
- What is one thing you know about Robert? *He does not have a square control panel.* What else do you know about him? *He does not have a nose or mouth.* Is there another robot like this? *No* Then do you know which robot has to be Robert? *Yes*
- What do you know about Randy? *He does not have a square control panel.* Is there another robot like this, or do you already know which robot that is? *Yes, Robert has the same thing but we know which robot is Robert.* Then is there one robot that has to be Randy? *Yes*
- What do you know about Rachel? *She does not have a nose or mouth.* Is there another robot like this, or do you know which robot that is? *Yes, Robert has the same thing but we know which robot is Robert.* Then is there only one robot that has to be Rachel? *Yes*
- What is one thing you know about Rollie? *He has arms.* What else do you know about him? *He has square eyes.* Is there another robot like this? *No*
- What do you know about Ramona? *She has arms.* Is there another robot like this, or do you already know which robot that is? *Rollie has arms but we know which robot is Rollie.*
- Which robot is left? *Rhonda is the only robot left.*

Solution:
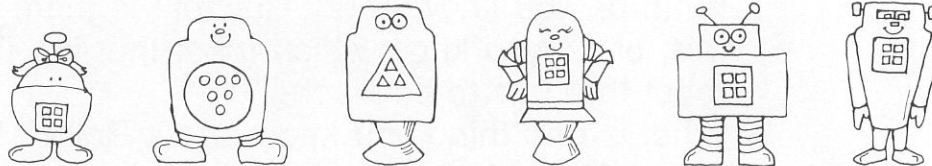
Rachel   Randy   Robert   Ramona   Rhonda   Rollie

LOOK BACK
- Read the problem again. Look at the information given and the main question. Review your work. Is your answer reasonable?

EXTEND IT
- Can you make up a problem like this?

PRACTICE
- Similar Practice Problems: 50, 77, 91

3   The Chin family is planning a summer vacation. They are trying to decide whether to travel by plane, train, or car. They will go to Yosemite National Park, Yellowstone National Park, or the Grand Canyon. They can stay in a motel or campground. What are all the different trips that the Chins could plan?

FIND OUT
- What is the question you have to answer?
- What is the Chin family doing?
- How many different ways can they travel? What are the ways?
- How many different places can they go to? What are the places?
- How many different places can they stay at? What are the places?
- What three things will make a trip?

CHOOSE A STRATEGY
- Circle to show what you choose.

SOLVE IT
- Begin your list with a way for them to travel. Which way? Which place should they go to? What about a place to stay? Have you got one trip now?
- If you use the same way to travel and the same place to go to again, is there another place to stay? Will this make a different trip?
- If you use the same way to travel, and change the place to go to, how many different trips can you add to your list? How many different trips do you have altogether now?
- If you use the same way to travel again, is there one more place to go to? How many different trips can you add to your list?
- Now can you go through these same steps again with the other two ways to travel?

Way to Travel	Place to Go	Place to Stay
plane	Yosemite	motel
plane	Yosemite	campground
p		

LOOK BACK
- Read the problem again. Look at the information given and the main question. Review your work. Is your answer reasonable?

3 The Chin family is planning a summer vacation. They are trying to decide whether to travel by plane, train, or car. They will go to Yosemite National Park, Yellowstone National Park, or the Grand Canyon. They can stay in a motel or campground. What are all the different trips that the Chins could plan?

FIND OUT
- What is the question you have to answer? *What are all the different kinds of trips that the Chins could plan?*
- What is the Chin family doing? *Planning a summer vacation*
- How many different ways can they travel? *3* What are the ways? *Plane, train, car*
- How many different places can they go to? *3* What are the places? *Yosemite, Yellowstone, Grand Canyon*
- How many different places can they stay at? *2* What are the places? *Motel or campground*
- What three things will make a trip? *A way to travel, a place to go, and a place to stay*

CHOOSE A STRATEGY
- Would it help if you could keep track of all the combinations of travel, places to go, and places to stay? *Yes*
- The symbol at the top of your sheet means that you can make an organized list to help solve the problem.

SOLVE IT
- (Following is just one example of a set of answers. There are many ways to make the list.)
- Begin your list with a way for them to travel. Which way? *Plane* Which place should they go to? *Yosemite* What about a place to stay? *Motel* Have you got one trip now? *Yes*
- If you use the same way to travel and same place to go to again, is there another kind of place to stay? *Yes, campground* Will this make a different trip? *Yes*
- If you use the same way to travel, and change the place to go to, how many different trips can you add to your list? *2* How many different trips do you have altogether now? *4*
- If you use the same way to travel again, is there one more place to go to? *Yes* How many different trips can you plan with this place? *2*
- Now can you go through these same steps again with the other two ways to travel? *Yes*

Solution: 18

Way to Travel	Place to Go	Place to Stay	Way to Travel	Place to Go	Place to Stay
plane	Yosemite	motel	t	Ye	cg
p	Yosemite	campground	t	GC	m
p	Yellowstone	m	t	GC	cg
p	Ye	cg	car	Yo	m
p	Grand Canyon	m	c	Yo	cg
p	GC	cg	c	Ye	m
train	Yo	m	c	Ye	cg
t	Yo	cg	c	GC	m
t	Ye	m	c	GC	cg

(continued)

LOOK BACK
- Read the problem again. Look at the information given and the main question. Review your work. Is your answer reasonable?

EXTEND IT
- If you add Disneyland to the places they can visit, how many different trips can the Chins plan?

4   On Saturday afternoon Mike and his friends are trying to decide what to do. They are going to bike, walk, or go by skateboard to the park. They can go swimming, play catch, or fly a kite at the park. Then they will go get ice cream, popcorn, or a soda. What are all the different plans Mike and his friends can make for Saturday afternoon?

FIND OUT
- What is the question you have to answer?
- What are Mike and his friends doing?
- How many different ways can they go to the park? What are the ways?
- How many different things can they do at the park? What are the different things to do?
- How many different things to eat are there? What are they?

CHOOSE A STRATEGY
- Circle to show what you choose.

SOLVE IT
- Begin your list with a way for them to get to the park. Which way? Now what do you want them to do at the park? What kind of food are they going to get? Have you got one plan now?
- If you stay with the same way to get to the park and the same thing to do at the park, what other kind of food is there? Is there still another kind of food? How many plans do you have on your list now?
- If you begin with the same way to get to the park again, then is there another thing for them to do? Then what are the different plans you can make with the different foods?
- How many different plans can you make with the same way to get to the park again, another thing to do, and the different foods?
- Can you go through the same steps with the other ways to get to the park?

How to Go	Do	Eat
bike	swim	ice cream
b	s	popcorn
b		

LOOK BACK
- Read the problem again. Look at the information given and the main question. Review your work. Is your answer reasonable?

4   On Saturday afternoon Mike and his friends are trying to decide what to do. They are going to bike, walk, or go by skateboard to the park. They can go swimming, play catch, or fly a kite at the park. Then they will go get ice cream, popcorn, or a soda. What are all the different plans Mike and his friends can make for Saturday afternoon?

FIND OUT
- What is the question you have to answer? *What are all the different plans Mike and his friends can make for Saturday afternoon?*
- What are Mike and his friends doing? *Trying to decide what to do on Saturday afternoon*
- How many different ways can they go to the park? *3* What are the ways? *Bike, walk, skateboard*
- How many different things can they do at the park? *3* What are the different things to do? *Swim, play catch, fly kite*
- How many different things to eat are there? *3* What are they? *Ice cream, popcorn, soda*

CHOOSE A STRATEGY
- Would it help to keep track of each possible plan they can make? *Yes*
- The symbol at the top of your sheet means you can make an organized list to help solve the problem.

SOLVE IT
- Begin your list with a way for them to get to the park. Which way? *Bike* Now what do you want them to do at the park? *Swim* What kind of food are they going to get? *Ice cream* Have you got one plan now? *Yes*
- If you stay with the same way to get to the park and the same thing to do at the park, what other kind of food is there? *Popcorn* Is there still another kind of food? *Yes, soda* How many plans do you have on your list now? *3*
- If you begin with the same way to get to the park again, then is there another thing for them to do? *Yes, play catch* Then what are the different plans you can make with the different foods? *Bike, catch, ice cream; Bike, catch, popcorn; Bike, catch, soda*
- How many different plans can you make with the same way to get to the park again, another thing to do, and the different foods? *3*
- Can you go through the same steps with the other ways to get to the park? *Yes*

Solution: 27

How to Go	Do	Eat	How to Go	Do	Eat
bike	swim	ice cream	w	c	p
b	s	popcorn	w	c	s
b	s	soda	w	k	i
b	catch	i	w	k	p
b	c	p	w	k	s
b	c	s	skateboard	s	i
b	kite	i	s	s	p
b	k	p	s	s	s
b	k	s	s	c	i
walk	s	i	s	c	p
w	s	p	s	c	s
w	s	s	s	k	i
w	c	i	s	k	p
			s	k	s

(continued)

LOOK BACK
- Read the problem again. Look at the information given and the main question. Review your work. Is your answer reasonable?

EXTEND IT
- If they can also run to the park, how many different plans can Mike and his friends make for Saturday afternoon?

PRACTICE
- Similar Practice Problems: 49, 75, 93

5 In the movie "The Secret Step" the heroine, Pauline, is at the bottom of a pyramid. She has a note that tells her to climb the pyramid, carefully counting the steps. When she has climbed a special number of steps, she should look for a loose stone. Behind the stone is the treasure map. The note gives Pauline clues about the special number of steps she should climb up:

- There are more than 125.
- There are fewer than 180.
- If you count by 5s, you say the number's name.
- The number can be divided evenly by 4 and 8.

How many steps did Pauline climb up?

FIND OUT
- What is the question you have to answer?
- Where is Pauline? What does she have?
- What does the note tell Pauline to do?
- What are the clues in the note?

CHOOSE A STRATEGY
- Circle to show what you choose.

SOLVE IT
- What is the greatest number in the clues? Make this the greatest number in your table.
- What is the least number in the clues? Make this the least number in your table.
- Look at the third clue: If you count by 5s you say the number's name. What kind of numbers do you want to put in your table between the least and greatest numbers?
- What is the last clue?
- Which number do you want to begin with? Can you divide 130 evenly by 4? by 8? Can you divide 135 evenly by 4? by 8? Can you divide 140 evenly by 4? by 8?
- Keep trying the numbers in your table. How many steps did Pauline climb up?

125   130   180

LOOK BACK
- Read the problem again. Look at the information given and the main question. Review your table. Is your answer reasonable?

5   In the movie "The Secret Step" the heroine, Pauline, is at the bottom of a pyramid. She has a note that tells her to climb the pyramid, carefully counting the steps. When she has climbed a special number of steps, she should look for a loose stone. Behind the stone is the treasure map. The note gives Pauline clues about the special number of steps she should climb up:
- There are more than 125.
- There are fewer than 180.
- If you count by 5s, you say the number's name.
- The number can be divided evenly by 4 and 8.

How many steps did Pauline climb up?

FIND OUT
- What is the question you have to answer? *How many steps did Pauline climb up?*
- Where is Pauline? What does she have? *She is at the bottom of a pyramid and she has a note.*
- What does the note tell Pauline to do? *Climb up a special number of steps, look for a loose stone and the treasure map.*
- What are the clues in the note? *The number of steps is more than 125, fewer than 180. If you count by 5s, you say the number's name, and it can be divided evenly by 4 and 8.*

CHOOSE A STRATEGY
- Would it help to see the numbers that could be the answer? *Yes*
- The symbol at the top of your sheet means that you can use or make a table to help solve the problem.

SOLVE IT
- What is the greatest number in the clues? *180* Make this the greatest number in your table.
- What is the least number in the clues? *125* Make this the least number in your table.
- Look at the third clue: If you count by 5s you say the number's name. What kind of numbers do you want to put in your table between the least and greatest numbers? *The next number would be 130, then 135 and then every 5, until 180.*
- What is the last clue? *The number can be divided evenly by 4 and 8.*
- Which number do you want to begin with? *130, because we know the answer is greater than 125.* Can you divide 130 evenly by 4? *No* by 8? *No* Can you divide 135 evenly by 4? *No* by 8? *No* Can you divide 140 by 4? *Yes* by 8? *No*
- Keep trying the numbers in your table. How many steps did Pauline climb up? *160*

Solution: 160

~~125~~	~~130~~	~~135~~	~~140~~	~~145~~	~~150~~	~~155~~	160	~~165~~	~~170~~	~~175~~	~~180~~
	(4)						(4 & 8)				

LOOK BACK
- Read the problem again. Look at the information given and the main question. Review your table. Is your answer reasonable?

EXTEND IT
- Each mystery number is an odd two-digit number. The sum of the digits is 8. What numbers could be the mystery numbers?

6   One summer Osha kept a record of how many kilometers she rode on her skateboard. She won't tell what the number is but she will give you these clues:
- It is less than 100.
- It is more than 44.
- If you count by 4s, you say the number's name.
- The number can be divided evenly by 5 and 8.

How many kilometers did Osha go on her skateboard?

FIND OUT
- What is the question you have to answer?
- What did Osha keep a record of?
- What are the clues that Osha gives?

CHOOSE A STRATEGY
- Circle to show what you choose.

SOLVE IT
- What is the greatest number in the clues? Make this the greatest number in your table.
- What is the least number in the clues? Make this the least number in your table.
- Look at the third clue: If you count by 4s, you say the number's name. What kind of numbers do you want to put between the least and greatest numbers in your table?
- What is the last clue?
- Which number do you want to begin with? Can you divide 48 evenly by 5? by 8? Can you divide 52 evenly by 5? by 8? Can you divide 56 evenly by 5? by 8?
- Keep trying the numbers in your table. How many kilometers did Osha go on her skateboard?

44 48	100

LOOK BACK
- Read the problem again. Look at the information given and the main question. Review your table. Is your answer reasonable?

6 One summer Osha kept a record of how many kilometers she rode on her skateboard. She won't tell what the number is but she will give you these clues:

- It is less than 100.
- It is more than 44.
- If you count by 4s, you say the number's name.
- The number can be divided evenly by 5 and 8.

How many kilometers did Osha go on her skateboard?

FIND OUT
- What is the question you have to answer? *How many kilometers did Osha go on her skateboard?*
- What did Osha keep a record of? *How many kilometers she went on her skateboard.*
- What are the clues that Osha gives? *It is less than 100; greater than 44; if you count by 4s, you say the number's name, and the number can be divided evenly by 5 and 8.*

CHOOSE A STRATEGY
- Would it help to see the numbers that could be the answer? *Yes*
- The symbol at the top of your sheet means to use or make a table to help solve the problem.

SOLVE IT
- What is the greatest number in the clues? *100* Make this the greatest number in your table.
- What is the least number in the clues? *44* Make this the least number in your table.
- Look at the third clue: If you count by 4s, you say the number's name. What kind of numbers do you want to put between the least and greatest numbers in your table? *We want to count by 4s from 44, so the next number would be 48, then 52 and so on.*
- What is the last clue? *The number can be divided evenly by 5 and 8.*
- Which number do you want to begin with? *48, because we know the number is higher than 44.* Can you divide 48 evenly by 5? *No* by 8? *Yes* Can you divide 52 evenly by 5? *No* by 8? *No* Can you divide 56 evenly by 5? *No* by 8? *Yes*
- Keep trying the numbers in your table. How many kilometers did Osha go on her skateboard? *80*

Solution: 80

~~44~~ ~~48~~ ~~52~~ ~~56~~ ~~60~~ ~~64~~ ~~68~~ ~~72~~ ~~76~~ (80) ~~84~~ ~~88~~ ~~92~~ ~~96~~ ~~100~~

LOOK BACK
- Read the problem again. Look at the information given and the main question. Review your work. Is your answer reasonable?

EXTEND IT
- Each mystery number is odd, but not a multiple of 5. The sum of the digits is less than 8. What numbers could be the mystery numbers?

PRACTICE
- Similar Practice Problems: 51, 70, 89

7 Angelina's club is having a meeting. They have decided that everyone should have a secret number. They will use just the numerals 1, 3, and 5 in their numbers, but each number will be different. Each numeral can be used only once in any number. If they use all the different three-digit numbers that you can make with the numerals 1, 3, and 5, how many members does Angelina's club have?

FIND OUT
- What is the question you have to answer?
- What is Angelina's club doing?
- How many numerals are they using to make the secret numbers? What are the numerals?
- Are there any conditions for making the numbers?

CHOOSE A STRATEGY
- Circle to show what you choose.

SOLVE IT
- How many numerals are they using to make the secret numbers? What are the numerals?
- Put one number on your list. What is your number? Now keep the same numeral in the hundreds' place and make a different number. What are your numbers? Can you make a different number with the same numeral in the hundreds' place?
- Put another numeral in the hundreds' place. How many new numbers can you add to the list if you keep the same numeral in the hundreds' place?
- Finish your list. How many members does Angelina's club have?

135
153

LOOK BACK
- Read the problem again. Look at the information given and the main question. Review your work. Is your answer reasonable?

7 Angelina's club is having a meeting. They have decided that everyone should have a secret number. They will use just the numerals 1, 3, and 5 in their numbers, but each number will be different. Each numeral can be used only once in any number. If they use all the different three-digit numbers that you can make with the numerals 1, 3, and 5, how many members does Angelina's club have?

FIND OUT
- What is the question you have to answer? *If they use all the different three-digit numbers that you can make with the numerals 1, 3, and 5, how many members does Angelina's club have?*
- What is Angelina's club doing? *They are having a meeting and making up secret numbers.*
- How many numerals are they using to make the secret numbers? *3* What are the numerals? *1, 3, and 5*
- Are there any conditions for making the numbers? (Be sure the students understand what "the conditions" means. You can discuss what kinds of conditions they have at home or at school; for visiting friends, watching television, doing homework, or for what time they have to be home.) *Yes, each numeral can be used only once in any number.*

CHOOSE A STRATEGY
- Would it help to keep track of all the different numbers you can make? *Yes*
- The symbol at the top of your sheet means you can make an organized list to help solve the problem.

SOLVE IT
- How many numerals are they using to make the secret numbers? *3* What are the numerals? *1, 3, 5*
- Put one number on your list. What is your number? *135* Now keep the same numeral in the hundreds' place and make a different number. What is your number? *153* Can you make a different number with the same numeral in the hundreds' place? *No*
- Put another numeral in the hundreds' place. How many new numbers can you add to the list if you keep the same numeral in the hundreds' place? *2*
- Finish your list. How many members does Angelina's club have? *6*

     Solution: 6   135   315   513
                     153   351   531

LOOK BACK
- Read the problem again. Look at the information given and the main question. Review your work. Is your answer reasonable?

EXTEND IT
- How many different two-digit numbers could they make with the same numerals?

8   The Cars For Kings Company is putting out the new models. They want to put a 4-digit number on the back of each new model car. They have decided to use only the numerals 2, 5, 7, and 8. Each numeral can only be used once in a number. How many different numbers can the Cars For Kings Company put on the backs of the new model cars?

FIND OUT
- What is the question you have to answer?
- What is the Cars For Kings Company doing?
- How many numerals are they going to use? What are the numerals?

CHOOSE A STRATEGY
- Circle to show what you choose.

SOLVE IT
- How many numerals is the car company going to use? What are the numerals?
- Begin with any number and put it in your list. Now if you leave the same numeral in the thousands' place and hundreds' place, can you make a different number? another different number?
- If you leave the same numeral in the thousands' place and change the numeral in the hundreds' place, how many different numbers can you make?
- Can you leave the same numeral in the thousands' place and change the numeral in the hundreds' place again? How many different numbers can you add to your list?
- Change the numeral in the thousands' place and go through all the steps again. Finish your list.
- How many different numbers can the Cars For Kings Company put on the backs of their new model cars?

2 5 7 8
2 5 8 7

LOOK BACK
- Read the problem again. Look at the information given and the main question. Review your work. Is your answer reasonable?

8   The Cars For Kings Company is putting out the new models. They want to put a 4-digit number on the back of each new model car. They have decided to use only the numerals 2, 5, 7, and 8. Each numeral can only be used once in a number. How many different numbers can the Cars For Kings Company put on the backs of the new model cars?

FIND OUT
- What is the question you have to answer? *How many different numbers can the Cars For Kings Company put on the backs of their new model cars?*
- What is the Cars For Kings Company doing? *They are putting numbers on the backs of their new model cars.*
- How many numerals are they going to use? *4* What are the numerals? *2, 5, 7, 8*

CHOOSE A STRATEGY
- Would it help to keep track of each number you can make? *Yes*
- The symbol at the top of your sheet means you can make an organized list to help solve the problem.

SOLVE IT
- How many numerals is the car company going to use? *4* What are the numerals? *2, 5, 7, 8*
- Begin with any number and put it in your list. Now if you leave the same numerals in the thousands' place and hundreds' place, can you make a different number? *Yes* another different number? *No*
- If you leave the same numeral in the thousands' place and change the numeral in the hundreds' place, how many different numbers can you add to your list? *2*
- Can you leave the same numeral in the thousands' place and change the numeral in the hundreds' place again? *Yes* How many different numbers can you add to your list? *2*
- Change the numeral in the thousands' place and go through all the steps again. Finish your list.
- How many different numbers can the Cars For Kings Company put on the backs of their new model cars? *24*

Solution: 24		
	2578	7825
	2587	7852
	2758	7285
	2785	7258
	2857	7582
	2875	7528
	5278	8257
	5287	8275
	5728	8527
	5782	8572
	5827	8725
	5872	8752

(continued)

LOOK BACK
- Read the problem again. Look at the information given and the main question. Review your work. Is your answer reasonable?

EXTEND IT
- If the Cars For Kings Company decided to use the numerals 1, 2, 5, 7, and 8, how many different numbers could they put on the backs of the new model cars?

PRACTICE
- Similar Practice Problems: 53, 79, 98

9 The kitten climbed its first tree and got stuck on the top branch. First it went up the trunk of the tree and on up to the 6th branch. A big squirrel scared the kitten and it climbed down 3 branches. A bird flew at the kitten and scared it again. Now it climbed up 10 branches. The kitten climbed back down 2 branches and then went up 4 branches to the very top of the tree. How many branches were in the tree?

FIND OUT
- What is the question you have to answer?
- What was the kitten doing?
- Where did the kitten go first? Where did it go next? After the bird scared it, where did it go? It climbed back how many branches? What was the last thing the kitten did?

CHOOSE A STRATEGY
- Circle to show what you choose.

SOLVE IT
- Now do you add more lines, or count back? How many?
- Which line on your diagram do you begin counting from now? Will you add more lines to the diagram?
- Now do you add more lines to your diagram, or count back?
- Finish your diagram. How many branches were on the tree?
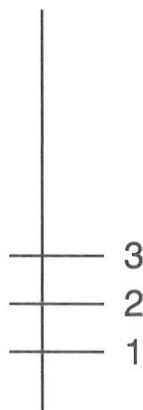
```
        |
        |
        |
        |
      --- 3
      --- 2
      --- 1
        |
```

LOOK BACK
- Read the problem again. Look at the information given and the main question. Review your work. Is your answer reasonable?

9   The kitten climbed its first tree and got stuck on the top branch. First it went up the trunk of the tree and on up to the 6th branch. A big squirrel scared the kitten and it climbed down 3 branches. A bird flew at the kitten and scared it again. Now it climbed up 10 branches. The kitten climbed back down 2 branches and then went up 4 branches to the very top of the tree. How many branches were in the tree?

FIND OUT
- What is the question you have to answer? *How many branches were in the tree?*
- What was the kitten doing? *Climbing a tree*
- Where did the kitten go first? *Up 6 branches* Where did it go next? *Back down 3 branches* After the bird scared it, where did it go? *Up 10 branches* Then it climbed back how many branches? *2* What was the last thing the kitten did? *Up 4 branches*
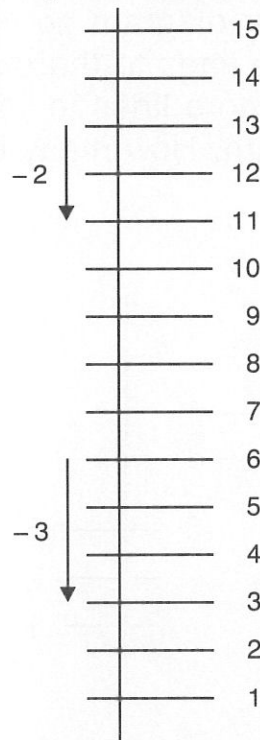
CHOOSE A STRATEGY
- Would it help to see where the kitten is going? *Yes*
- The symbol at the top of your sheet means to make a picture or diagram to help solve the problem.

SOLVE IT
- It is easy to make a diagram of this problem. Make one vertical line and then mark off lines for the branches. When you begin your diagram, how many branches will you show? *6*
- Now do you add more lines, or count back? *Count back* How many? *3*
- Which line on your diagram do you begin counting from now? *The third one up* Will you add more lines to the diagram? *Yes, 7 lines*
- Now do you add more lines to your diagram, or count back? *Count back 2*
- Finish your diagram. How many branches were on the tree? *15*

Solution: 15

```
          ———— 15
          ———— 14
          ———— 13
   -2 |   ———— 12
      |   ———— 11
      ↓   ———— 10
          ———— 9
          ———— 8
          ———— 7
          ———— 6
          ———— 5
   -3 |   ———— 4
      ↓   ———— 3
          ———— 2
          ———— 1
```

LOOK BACK
- Read the problem again. Look at the information given and the main question. Review your work. Is your answer reasonable?

EXTEND IT
- On the next time out the kitten went up a higher tree. It first went up 8 branches, then got scared and came down 5. Then it went up 10, before coming back down 3. Feeling very brave, the kitten went up 6 branches, back 2, and then up 7 branches to the very top. How many branches were in the tree?

10 Zork is looking for friends to play spaceball. His friends all live in his galaxy. Zork leaves his planet and flies 5 planets west to get Zeek. Zeek lives on the first planet in the galaxy. Then Zork flies east 8 planets to get Zook. From here he flies west 6 planets to find Zurk. Then he flies east 9 planets for Zack. Zack lives on the last planet in the galaxy. How many planets are in Zork's galaxy?

FIND OUT
- What is the question you have to answer?
- What is Zork doing?
- Where does Zork go first? Then after getting Zeek where does he go? Where does he go to get Zook? How does he get Zurk? Where is Zack?

CHOOSE A STRATEGY
- Circle to show what you choose.

SOLVE IT
- You can make a diagram for this problem. Make a horizontal line and mark off the planets. Where is the first place you want to mark for Zeek?
- Will the next mark on the line for Zook go to the left or right of the first one? How many planets do you want to show between Zeek and Zook?
- Do you move to the right or left of the second mark to show where Zurk is?
- Finish your diagram. How many planets are in Zork's galaxy?

W ──┴──┴──┴──┴──┴──✕─────────────── E

Zeek   Zork

LOOK BACK
- Read the problem again. Look at the information given and the main question. Review your work. Is your answer reasonable?

10 Zork is looking for friends to play spaceball. His friends all live in his galaxy. Zork leaves his planet and flies 5 planets west to get Zeek. Zeek lives on the first planet in the galaxy. Then Zork flies east 8 planets to get Zook. From here he flies west 6 planets to find Zurk. Then he flies east 9 planets for Zack. Zack lives on the last planet in the galaxy. How many planets are in Zork's galaxy?

FIND OUT
- What is the question you have to answer? *How many planets are in Zork's galaxy?*
- What is Zork doing? *He is getting friends together to play spaceball.*
- Where does Zork go first? *He flies 5 planets west to get Zeek.* Then after getting Zeek where does he go? *He goes east 8 planets to get Zook.* Where does he go to get Zurk? *West 6 planets* Where is Zack? *East 9 planets from Zurk*

CHOOSE A STRATEGY
- Would it help to try and make a diagram showing all the different places that Zork goes? *Yes*
- The symbol at the top of your sheet means to make a picture or diagram.

SOLVE IT
- You can make a diagram for this problem. Make a horizontal line and mark off the planets. Where is the first place you want to mark for Zeek? *5 points to the left of the starting point, or the first point on the left* (Point out that this will be the farthest point to the left because it says in the problem that Zeek lives on the first planet in the galaxy.)
- Will the next mark on the line for Zook go to the left or right of the first one? *The next point to mark will be to the right 8.* How many planets do you want to show between Zeek and Zook? *8*
- Do you move to the right or left of the second mark to show where Zurk is? *We want to go left 6.*
- Finish your diagram. How many planets are in Zork's galaxy? *12*

Solution: 12
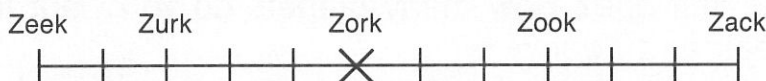
Zeek	Zurk	Zork	Zook	Zack

LOOK BACK
- Read the problem again. Look at the information given and the main question. Review your work. Is your answer reasonable?

EXTEND IT
- Can you make up a problem like this?

PRACTICE
- Similar Practice Problems: 52, 76, 94

11 "We're hungry!" yelled Martina's sister and brothers. "Where are the pancakes?" Martina didn't pay any attention. She was trying to figure out how to measure out 24 ounces of milk. She had 3 different cans, marked 12 ounces, 6 ounces, and 4 ounces. Each can had just one number marked on it. How many different ways could Martina measure 24 ounces of milk?

FIND OUT
- What is the question you have to answer?
- What is Martina doing?
- What does Martina have to measure?
- What does Martina have to measure with?

CHOOSE A STRATEGY
- Circle to show what you choose.

SOLVE IT
- How many columns do you have in your list? What is at the top of each column?
- Begin with 12. How many times does she need to fill the 12-ounce can to make 24 ounces?
- Begin with 12 again. How can she combine the 12-ounce can with the 6-ounce can to make 24 ounces?
- Is there another way to use the 12-ounce can?
- Finish filling in your list. How many different ways could Martina measure 24 ounces of milk?

12 oz.	6 oz.	4 oz.
2		
1	2	

LOOK BACK
- Read the problem again. Look at the information given and the main question. Review your list. Is your answer reasonable?

11 "We're hungry!" yelled Martina's sister and brothers. "Where are the pancakes?" Martina didn't pay any attention. She was trying to figure out how to measure out 24 ounces of milk. She had 3 different cans, marked 12 ounces, 6 ounces, and 4 ounces. Each can had just one number marked on it. How many different ways could Martina measure 24 ounces of milk?

FIND OUT
- What is the question you have to answer? *How many different ways could Martina measure 24 ounces of milk?*
- What is Martina doing? *Making pancakes*
- What does Martina have to measure? *24 ounces of milk*
- What does Martina have to measure with? *3 cans: 12 ounces, 6 ounces, 4 ounces*

CHOOSE A STRATEGY
- Would it help to keep track of each way Martina can measure 24 ounces? *Yes*
- The symbol at the top of your paper means that you can make an organized list to help you solve the problem.

SOLVE IT
- How many columns do you have in your list? *3* What is at the top of each column? *12 oz, 6 oz, 4 oz - for each of the cans*
- Begin with 12. How many times does she need to fill the 12-ounce can to make 24 ounces? *2*
- Begin with 12 again. How can she combine the 12-ounce can with the 6-ounce can to make 24 ounces? *One 12 oz with two 6 oz*
- Is there another way to use the 12-ounce can? *Yes, one 12 oz with three 4 oz*
- Finish filling in your list. How many different ways could Martina measure 24 ounces of milk? *6*

Solution: 6

12 oz.	6 oz.	4 oz.
2		
1	2	
1		3
	4	
	2	3
		6

LOOK BACK
- Read the problem again. Look at the information given and the main question. Review your list. Is your answer reasonable?

EXTEND IT
- If Martina has to measure 48 ounces of milk, how many different ways can she do this with the same 12-ounce, 6-ounce, and 4-ounce cans?

12 Allen was at a neighborhood garage sale. He was standing at a table with all sorts of comic books divided into 3 piles. One pile was marked 10 cents, the second 5 cents, and the third 1 cent. Allen had 26 cents. How many different combinations of comic books could Allen buy for 26 cents?

FIND OUT
- What is the question you have to answer?
- What is Allen doing?
- How many different piles of comics are there?
- What is the price for the comics in each pile?

CHOOSE A STRATEGY
- Circle to show what you choose.

SOLVE IT
- How many columns do you have in your list? What is at the top of each column?
- Begin with 10 cents. How many comics from this pile can Allen get with his 26 cents? Will he have money left? How many comics from the 5-cent pile can he get with the money left over? Is there still money left? How many comics from the 1-cent pile can he get with the money left over?
- Begin with 10 cents again. If he gets two from this pile again, how can you combine this with comics from the 1-cent pile?
- How many different ways can Allen get one comic from the 10-cent pile with comics from the other piles?
- Finish filling in your list. How many different combinations of comic books could Allen buy?

10¢	5¢	1¢
2	1	1
2	0	6

LOOK BACK
- Read the problem again. Look at the information given and the main question. Review your list. Is your answer reasonable?

12 Allen was at a neighborhood garage sale. He was standing at a table with all sorts of comic books divided into 3 piles. One pile was marked 10 cents, the second 5 cents, and the third 1 cent. Allen had 26 cents. How many different combinations of comic books could Allen buy for 26 cents?

FIND OUT
- What is the question you have to answer? *How many different combinations of comic books could Allen buy for 26 cents?* (You might want to define what a combination is: one or two from one pile together with comics from one or more other piles.)
- What is Allen doing? *Looking at comic books for sale*
- How many different piles of comics are there? *3*
- What is the price for the comics in each pile? *10 cents, 5 cents, and 1 cent*

CHOOSE A STRATEGY
- Would it help to keep track of each combination of comic books that Allen could buy? *Yes*
- The symbol at the top of your paper means that you can make an organized list to help solve the problem.

SOLVE IT
- How many columns do you have in your list? *3* What is at the top of each column? *10 cents, 5 cents, 1 cent*
- Begin with 10 cents. How many comics from this pile can Allen get with his 26 cents? *2* Will he have money left? *Yes* How many comics from the 5-cent pile can he get with the money left over? *1* Is there still money left? *Yes* How many comics from the 1-cent pile can he get with the money left over? *1*
- Begin with 10 cents again. If he gets two from this pile again, how many different ways can you combine this with comics from the 1-cent pile? *6*
- How many different ways can Allen get one comic from the 10-cent pile with comics from the other piles? *4*
- Finish filling in your list. How many different combinations of comic books could Allen buy? *12*

Solution: 12

10¢	5¢	1¢		10¢	5¢	1¢
2	1	1			5	1
2	0	6			4	6
1	3	1			3	11
1	2	6			2	16
1	1	11			1	21
1		16				26

(continued)

LOOK BACK
- Read the problem again. Look at the information given and the main question. Review your list. Is your answer reasonable?

EXTEND IT
- If Allen had 34 cents, how many different combinations of comic books could he buy from the same piles?

PRACTICE
- Similar Practice Problems: 57, 84, 110

13   Monica and Marty are llamas at the petting zoo. They like to count their visitors, and the number of people who pet them. After visiting hours on Sunday Monica reported that 105 people in all had petted both of them. She bragged that $2\frac{1}{2}$ times as many people petted her as petted Marty. How many people petted Monica and how many petted Marty?

FIND OUT
- What is the question you have to answer?
- What do Monica and Marty like to do?
- What is the total number of people who petted Monica and Marty on Sunday?
- What do you know about the number of people who petted Monica?
- What do you know about the number of people who petted Marty?

CHOOSE A STRATEGY
- Circle to show what you choose.

SOLVE IT
- Which llama do you want to make a guess for? Why?
- What is your guess?
- With a guess for one llama, how can you find a number for the other llama?
- How can you check your guess?
- How was your guess? If your first guess was wrong, how can you make your second guess better?

LOOK BACK
- Read the problem again. Look at the information given and the main question. Review your work. Is your answer reasonable?

13 Monica and Marty are llamas at the petting zoo. They like to count their visitors, and the number of people who pet them. After visiting hours on Sunday Monica reported that 105 people in all had petted both of them. She bragged that $2\frac{1}{2}$ times as many people petted her as petted Marty. How many people petted Monica and how many petted Marty?

FIND OUT
- What is the question you have to answer? *How many people petted Monica and how many petted Marty?*
- What do Monica and Marty like to do? *Count the number of people who pet them*
- What is the total number of people who petted Monica and Marty on Sunday? *105*
- What do you know about the number of people who petted Monica? *$2\frac{1}{2}$ as many as petted Marty*
- What do you know about the number of people who petted Marty? *Only that it is less than Monica*

CHOOSE A STRATEGY
- If you don't have much information, would it help to make a guess? *Yes*
- The symbol at the top of the page means that you can make a guess and then check it, to help solve the problem. If your guess is wrong, you can use the information to help you make another guess.

SOLVE IT
- (Following is just an example of one sequence of answers based on one possible guess.)
- Which llama do you want to make a guess for? *Marty* Why? *Because we have no information about Marty, and with a guess for Marty we can figure out a number for Monica.*
- What is your guess? *50 for Marty*
- With a guess for one llama, how can you find a number for the other llama? *We know that Monica is $2\frac{1}{2}$ times Marty, so we can just multiply $2\frac{1}{2}$ times 50 = 125*
- How can you check your guess? *Add the 125 and 50 and compare the total with 105*
- How was your guess? *Off by 70* If your first guess was wrong, how can you make your second guess better? *If the first guess was too high by 70, then we should make the guess for Marty lower.*

  Solution: Monica = 75, Marty = 30

LOOK BACK
- Read the problem again. Look at the information given and the main question. Review your work. Is your answer reasonable?

EXTEND IT
- Another Sunday Marty reported that a total of 200 people petted them both and this time $2\frac{1}{3}$ as many people petted him as petted Monica. How many people petted Marty and how many petted Monica?

14 Amy was soaking her poor sore feet! Together Amy and Marcus had walked a total of $10\frac{1}{2}$ miles in the Wilbur School Walk-a-thon. Amy walked twice as far as Marcus and she had blisters to prove it. How many miles did Amy and Marcus each walk?

FIND OUT
- What is the question you have to answer?
- What did Amy and Marcus do?
- What is the total number of miles they walked?
- What do you know about the number of miles that Amy walked?
- What do you know about the number of miles that Marcus walked?

CHOOSE A STRATEGY
- Circle to show what you choose.

SOLVE IT
- Which walker do you want to make a guess for? Why?
- What is your guess?
- If you make a guess for one walker, then how can you find the number of miles for the other walker?
- How can you check your guess?
- How was your guess? If your first guess was wrong, how can you make your second guess better?

LOOK BACK
- Read the problem again. Look at the information given and the main question. Review your work. Is your answer reasonable?

14 Amy was soaking her poor sore feet! Together Amy and Marcus had walked a total of 10½ miles in the Wilbur School Walk-a-thon. Amy walked twice as far as Marcus and she had blisters to prove it. How many miles did Amy and Marcus each walk?

FIND OUT
- What is the question you have to answer? *How many miles did Amy and Marcus each walk?*
- What did Amy and Marcus do? *They walked in a school Walk-a-thon.*
- What is the total number of miles they walked? *$10\frac{1}{2}$*
- What do you know about the number of miles that Amy walked? *She walked twice as far as Marcus.*
- What do you know about the number of miles that Marcus walked? *Only that it was less than Amy*

CHOOSE A STRATEGY
- You really don't have much information. Would it help to make a guess? *Yes*
- The symbol at the top of your page means to make a guess and check it, to help solve the problem. You can use the information from an incorrect guess to help you make another guess.

SOLVE IT
- (Following is just an example of one sequence of answers based on one possible guess.)
- Which walker do you want to make a guess for? *Marcus* Why? *Because we don't have any information about him, but we can figure out a number for Amy if we make a guess for Marcus.*
- What is your guess? *$4\frac{1}{2}$*
- If you make a guess for one walker, then how can you find the number of miles for the other walker? *Multiply by 2, because we know that Amy is twice as many. The answer for Amy would be 9.*
- How can you check your guess? *Add the two numbers together and compare with the total given in the problem.*
- How was your guess? *$13\frac{1}{2}$ is high by 3.* If your first guess was wrong, how can you make your second guess better? *If the guess gives an answer more than it should be, then the next guess should be lower.*

  Solution: Amy = 7, Marcus = $3\frac{1}{2}$

LOOK BACK
- Read the problem again. Look at the information given and the main question. Review your work. Is your answer reasonable?

EXTEND IT
- Another time Marcus and Amy entered a Bike-a-thon. Together they biked 51 miles. Marcus biked 3¼ times as far as Amy biked. How far did each of them bike in the Bike-a-thon?

PRACTICE
- Similar Practice Problems: 54, 74, 95

15 Donna was putting six new bears in the display case at the toy store. The case had three shelves, one on top of the other, with two spaces on each shelf. Each bear had a name: Abby, Bobby, Cathy, Dorothy, Eric, and Forrest. Donna put Dorothy next to Eric and above Forrest. She did not put Bobby next to Eric or Forrest. She did not put Abby next to Bobby. Where did Donna put each of the bears?

FIND OUT
- What is the question you have to answer?
- How many bears are there?
- What do you know about where Donna put Dorothy?
- What do you know about where Donna put Bobby?
- What do you know about where Donna put Abby?

CHOOSE A STRATEGY
- Circle to show what you choose.

SOLVE IT
- If you use a piece of paper for each bear, how many pieces of paper do you need? How are you going to mark the papers?
- Where can you put the paper for Dorothy?
- If you put Dorothy in one place, then can you find a place for Eric? What about Forrest?
- What do you know about where Bobby goes? Is there only one place that is not next to Forrest or Eric?
- Where does Abby go?
- Is there only one space left? Which bear is left?
- Is there another way to arrange the pieces of paper with the same directions?

Dorothy	

LOOK BACK
- Read the problem again. Look at the information given and the main question. Review your work. Is your answer reasonable?

15 Donna was putting six new bears in the display case at the toy store. The case had three shelves, one on top of the other, with two spaces on each shelf. Each bear had a name: Abby, Bobby, Cathy, Dorothy, Eric, and Forrest. Donna put Dorothy next to Eric and above Forrest. She did not put Bobby next to Eric or Forrest. She did not put Abby next to Bobby. Where did Donna put each of the bears?

FIND OUT
- What is the question you have to answer? *Where did Donna put each of the bears?*
- How many bears are there? *6*
- What do you know about where Donna put Dorothy? *Next to Eric and above Forrest*
- What do you know about where Donna put Bobby? *Not next to Eric or Forrest*
- What do you know about where Donna put Abby? *Not next to Bobby*

CHOOSE A STRATEGY
- Would it help to have pieces of paper marked with the names of the bears and be able to move around the pieces of paper? *Yes*
- The symbol at the top of the sheet means that you can act this problem out or use objects. By using objects you can explore different arrangements easily.

SOLVE IT
- (This is just one example of how you can go through this and the kinds of responses you might get. Students will do more with placing their papers and then moving them around when they see that the placement is wrong. Encourage them to see how many solutions they can find to the problem.)
- If you use a piece of paper for each bear, how many pieces of paper do you need? *6* How are you going to mark the papers? *We can write the names or just the first letter of each name.*
- Where can you put the paper for Dorothy? *In the middle on one side*
- If you put Dorothy in one place, then can you find a place for Eric? *We know that Eric is next to Dorothy, so he can go in the middle on the other side.* What about Forrest? *We know he is under Dorothy.*
- What do you know about where Bobby goes? *He is not next to Forrest or Eric.* Is there only one place that is not next to Forrest or Eric? *Yes, above Dorothy*
- Where does Abby go? *We can put her above Eric, but then that puts her next to Bobby, and that can't be. We need to move her below Eric.*
- Is there only one space left? *Yes* Which bear is left? *Cathy*
- Is there another way to arrange the pieces of paper with the same directions? *Yes*

Solution:

Cathy	Bobby
Eric	Dorothy
Abby	Forrest

LOOK BACK
- Read the problem again. Look at the information given and the main question. Review your work. Is your answer reasonable?

EXTEND IT
- The next month Donna had the same six bears along with Gerald and Hilda. She had a case with four shelves and two spaces on each shelf. She put Abby below Hilda and across from Eric. She put Cathy on the first shelf below Abby. She did not put Forrest next to Hilda or Cathy. She put Bobby on the top shelf and she did not put Dorothy next to Hilda. Where did Donna put each bear?

16 Dana's mother was telling her where to find things in the six sections of aisle E at the supermarket. Her mother said that the orange juice and pizza were at opposite ends of the same side of the aisle. She said the fish was across from the pizza and next to the french fries. She said the vegetables were not on the same side as the pizza. Where did Dana find the pizza, french fries, ice cream, orange juice, fish, and vegetables on aisle E?

FIND OUT
- What is the question you have to answer?
- What is Dana's mother doing?
- What do you know about where the orange juice and pizza are?
- What do you know about where the fish is?
- What do you know about where the vegetables are?

CHOOSE A STRATEGY
- Circle to show what you choose.

SOLVE IT
- If you use a piece of paper for each thing at the store, how many pieces of paper do you need? How are you going to mark the papers?
- Where will you put the orange juice and pizza?
- What do you know about the fish? Then can you put the french fries in a space?
- Where will you put the vegetables?
- Is there one empty space? Is there one thing left on Dana's list?
- Is there another way to arrange the food on aisle E?

E ——— orange juice ┆   ┆ ——— E

LOOK BACK
- Read the problem again. Look at the information given and the main question. Review your work. Is your answer reasonable?

16 Dana's mother was telling her where to find things in the six sections of aisle E at the supermarket. Her mother said that the orange juice and pizza were at opposite ends of the same side of the aisle. She said the fish was across from the pizza and next to the french fries. She said the vegetables were not on the same side as the pizza. Where did Dana find the pizza, french fries, ice cream, orange juice, fish, and vegetables on aisle E?

FIND OUT
- What is the question you have to answer? *Where did Dana find the pizza, french fries, ice cream, orange juice, fish, and vegetables on aisle E?*
- What is Dana's mother doing? *Telling her where the things are*
- What do you know about where the orange juice and pizza are? *They are at opposite ends of the same side of the aisle.*
- What do you know about where the fish is? *Across from the pizza and next to the french fries*
- What do you know about where the vegetables are? *Not on the same side as the pizza*

CHOOSE A STRATEGY
- Would it help to have pieces of paper marked with the name of each kind of food, and then be able to move them around? *Yes*
- The symbol at the top of your paper means that you can act out or use objects to help solve this problem. With pieces of paper you can move things around and explore different arrangements.

SOLVE IT
- (This is just one example of how you and your students might go through this problem. Encourage the students to see how many different solutions they can find for this problem.)
- If you use a piece of paper for each thing at the store, how many pieces of paper do you need? *6* How are you going to mark the papers? *With the name of each food or just letters*
- Where will you put the orange juice and pizza? *On each end of one row*
- What do you know about the fish? *It is across from the pizza and next to the french fries* Then can you put the french fries in a space? *After putting the fish in a space we can put the french fries next to the fish.*
- Where will you put the vegetables? *We can put them between the pizza and the orange juice. Then that isn't right because it's on the same side as the pizza and it should be on the other side. We need to move it to the only space open on the other side.*
- Is there one empty space? *Yes* Is there one thing left on Dana's list? *Yes, the ice cream*
- Is there another way to arrange the food on aisle E? *Yes*

Solution:

orange juice	ice cream	pizza	
vegetables	french fries	fish	E

LOOK BACK
- Read the problem again. Look at the information given and the main question. Review your work. Is your answer reasonable?
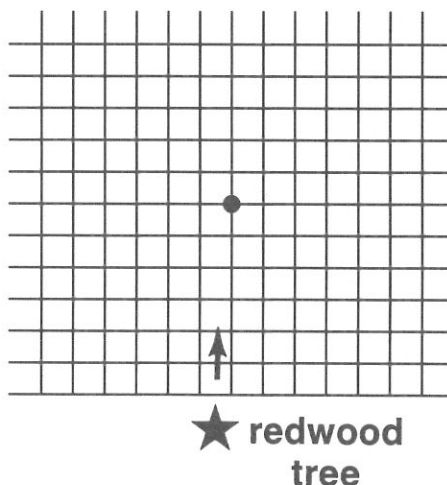
PRACTICE
- Similar Practice Problems: 55, 78, 92

17 The animals were having a meeting at the Big Oak. Roger gave Rachel Raccoon directions to the Big Oak from the tallest redwood tree. "Stand to the left of the redwood tree. Go ahead 6 trees, turn right and go ahead 9 trees and then turn left. Go straight until you see the eagle's nest, which is in the 12th tree ahead on your left. Turn left there and look for the mark a hunter made on the tree, 4 trees ahead on your left. Look to your right and you'll be at the Big Oak." Can you make a map to show how Rachel got to the Big Oak?

FIND OUT
- What is the question you have to answer?
- How was Roger helping Rachel?
- Where did Rachel start from?
- What are all the directions Roger gave Rachel?

CHOOSE A STRATEGY
- Circle to show what you choose.

SOLVE IT
- What is the first thing to mark on your map?
- How far did Rachel go first? Which way did she turn?
- How far did Rachel go next? Which way did she turn?
- When she goes ahead the third time, how far does she go? Which way does she turn?
- Now how far does she go? Which way does she turn?
- Where is Rachel now?

★ redwood
tree

LOOK BACK
- Read the problem again. Look at the information given and the main question. Review your map. Is your answer reasonable?

17 The animals were having a meeting at the Big Oak. Roger gave Rachel Raccoon directions to the Big Oak from the tallest redwood tree. "Stand to the left of the redwood tree. Go ahead 6 trees, turn right and go ahead 9 trees and then turn left. Go straight until you see the eagle's nest, which is in the 12th tree ahead on your left. Turn left there and look for the mark a hunter made on the tree, 4 trees ahead on your left. Look to your right and you'll be at the Big Oak." Can you make a map to show how Rachel got to the Big Oak?

FIND OUT
- What is the question you have to answer? *Can you make a map to show how Rachel got to the Big Oak?*
- How was Roger helping Rachel? *He gave her directions to the Big Oak.*
- Where did Rachel start from? *The tallest redwood tree*
- What are all the directions Roger gave Rachel? *Go ahead 6 trees, turn right; go ahead 9 trees, turn left; go straight 12 trees, turn left; go ahead 4 trees, look to the right*

CHOOSE A STRATEGY
- Would it help to make a map to show all the different directions that Rachel has to follow? *Yes*
- The symbol at the top of your sheet means to make a picture or diagram. Making a map with graph paper will help you to solve the problem.

SOLVE IT
- What is the first thing to mark on your map? *The redwood tree*
- How far did Rachel go first? *Ahead 6 trees* Which way did she turn? *Right*
- How far did Rachel go next? *Ahead 9 trees* Which way did she turn? *Left*
- When she goes ahead the third time, how far does she go? *12 trees* Which way does she turn? *Left*
- Now how far does she go? *4* Which way does she turn? *Right*
- Where is Rachel now? *At the Big Oak*

Solution:
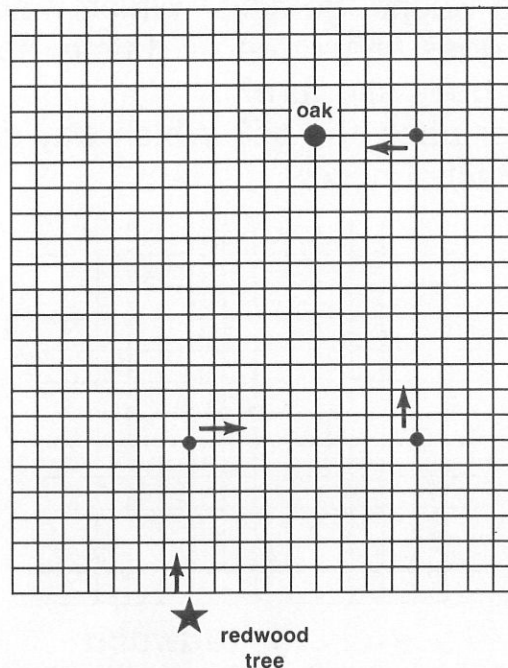
oak

redwood
tree

LOOK BACK
- Read the problem again. Look at the information given and the main question. Review your map. Is your answer reasonable?

EXTEND IT
- What are several different ways back to the tallest redwood tree? What is the shortest way back to the redwood tree?

T•34

18 Kim and Leadra programmed Rosie The Robot to travel around the school. They sent her out of their classroom, had her turn right and go straight down the hall 6 classrooms and then turn left. They had her go straight 4 classrooms and then turn right. She went ahead 6 classrooms and turned right. She went ahead 7 classrooms and then she suddenly stopped and started to beep! Can you draw a map and show where Rosie started to beep?

FIND OUT
- What is the question you have to answer?
- What did Kim and Leadra do?
- Where did Rosie start from?
- What are all the directions Rosie followed, until she stopped?

CHOOSE A STRATEGY
- Circle to show what you choose.

SOLVE IT
- What is the first thing you want to mark on your map?
- How far does Rosie go first? Which way does she turn?
- How far does Rosie go next? Which way does she turn?
- Rosie goes ahead how far now? Which way does she turn?
- How far ahead did Rosie go before she stopped? Put a mark on your map where she stopped.
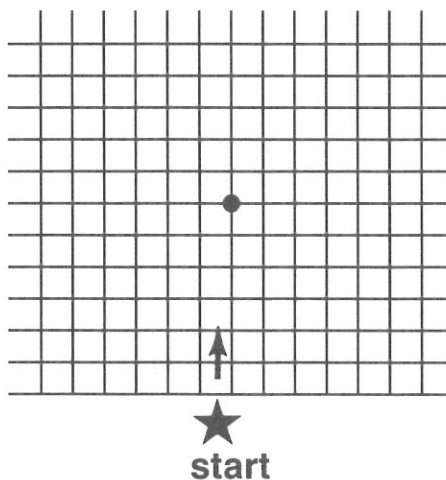
★
start

LOOK BACK
- Read the problem again. Look at the information given and the main question. Review your map. Is your answer reasonable?

18 Kim and Leadra programmed Rosie The Robot to travel around the school. They sent her out of their classroom, had her turn right and go straight down the hall 6 classrooms and then turn left. They had her go straight 4 classrooms and then turn right. She went ahead 6 classrooms and turned right. She went ahead 7 classrooms and then she suddenly stopped and started to beep! Can you draw a map and show where Rosie started to beep?

FIND OUT
- What is the question you have to answer? *Can you draw a map and show where Rosie started to beep?*
- What did Kim and Leadra do? *Wrote a program to send Rosie The Robot around their school*
- Where did Rosie start from? *Their classroom*
- What are all the directions Rosie followed, until she stopped? *Right from the classroom; straight ahead 6 classrooms, left; straight ahead 4 classrooms, right; straight ahead 4 classrooms, right; straight ahead 7 classrooms, stop*

CHOOSE A STRATEGY
- Would it help to make a map to show all the directions that the robot followed? *Yes*
- The symbol on your sheet means to make a picture or diagram. Making a map can help you to solve the problem.

SOLVE IT
- What is the first thing you want to mark on your map? *Where Rosie started from*
- How far does Rosie go first? *Ahead for 6 classrooms* Which way does she turn? *Left*
- How far does Rosie go next? *Straight ahead 4 classrooms* Which way does she turn? *Right*
- Rosie goes ahead how far now? *Straight ahead 6 classrooms* Which way does she turn? *Right*
- How far ahead did Rosie go before she stopped? *7 classrooms* Put a mark on your map where she stopped.

Solution:
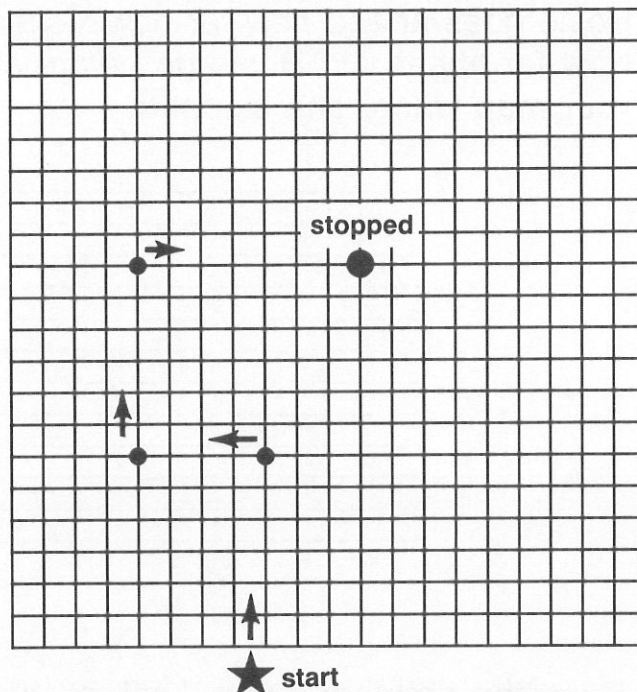
LOOK BACK
- Read the problem again. Look at the information given and the main question. Review your map. Is your answer reasonable?

EXTEND IT
- Create a maze for Rosie. Can you write directions to get the robot out of the maze?

PRACTICE
- Similar Practice Problems: 56, 82, 99

19 Melody and Mandy are circus elephants. They always lead the circus parade. Melody is 4 years old and Mandy is 13 years old. When will Mandy be twice as old as Melody?

FIND OUT
- What is the question you have to answer?
- How old is Melody?
- How old is Mandy?

CHOOSE A STRATEGY
- Circle to show what you choose.

SOLVE IT
- If you make a table, how many rows do you need?
- What do you want to keep track of in the first row of your table?
- What do you want to keep track of in the second row of your table?
- What numbers are you going to put in the first column?
- What is the next number for Melody? for Mandy?
- What are you looking for in each column of the table?
- Keep adding numbers to the table until you find a column with the right combination of numbers. When will Mandy be twice as old as Melody?

Melody	4	5
Mandy	13	14

LOOK BACK
- Read the problem again. Look at the information given and the main question. Review your table. Is your answer reasonable?

19 Melody and Mandy are circus elephants. They always lead the circus parade. Melody is 4 years old and Mandy is 13 years old. When will Mandy be twice as old as Melody?

FIND OUT
- What is the question you have to answer? *When will Mandy be twice as old as Melody?*
- How old is Melody? *4*
- How old is Mandy? *13*

CHOOSE A STRATEGY
- Would it help to keep track of the ages of the two elephants? *Yes*
- The symbol at the top of your page means to use or make a table to help solve the problem.

SOLVE IT
- If you make a table, how many rows do you need? *2*
- What do you want to keep track of in the first row of your table? *The age of Mandy*
- What do you want to keep track of in the second row of your table? *The age of Melody*
- What numbers are you going to put in the first column? *13 for Mandy, 4 for Melody*
- What is the next number for Melody? *5* for Mandy? *14*
- What are you looking for in each column of the table? *The number for Mandy to be twice that of the number for Melody*
- Keep adding numbers to the table until you find a column with the right combination of numbers. When will Mandy be twice as old as Melody? *5 years* (Mandy is 18, Melody 9)

Solution: 5 years (Mandy 18, Melody 9)

Melody	4	5	6	7	8	9
Mandy	13	14	15	16	17	18

LOOK BACK
- Read the problem again. Look at the information given and the main question. Review your table. Is your answer reasonable?

EXTEND IT
- If Melody is 2 and Mandy is 7, when will Mandy be 1½ times as old as Melody?

20 The Goofy Gardener had some very strange plants in his greenhouse. He raises purple pigeon plants that grow 1 foot a day and green monster ferns that grow 2 feet a day. Today the Goofy Gardener found that he has a purple pigeon plant 1 foot high and a monster fern 7 feet high. In how many days will the monster fern be three times as high as the pigeon plant?

FIND OUT
- What is the question you have to answer?
- What does the Goofy Gardener have?
- How much do his pigeon plants grow each day?
- How much do his monster ferns grow each day?
- How high is his pigeon plant today?
- How high is his monster fern today?

CHOOSE A STRATEGY
- Circle to show what you choose.

SOLVE IT
- How many rows do you need in your table?
- What are you keeping track of in the first row?
- What are you keeping track of in the second row?
- What number goes in the first column for the pigeon plant?
- What number goes in the first column for the monster fern?
- What numbers go in the second column?
- What are you looking for in each column?
- Keep adding numbers to the table, until you find the column with the right numbers. In how many days will the monster fern be three times as high as the pigeon plant?

	1	2
pigeon plant	1	
monster fern	7	

LOOK BACK
- Read the problem again. Look at the information given and the main question. Review your table. Is your answer reasonable?

20   The Goofy Gardener had some very strange plants in his greenhouse. He raises purple pigeon plants that grow 1 foot a day and green monster ferns that grow 2 feet a day. Today the Goofy Gardener found that he has a purple pigeon plant 1 foot high and a monster fern 7 feet high. In how many days will the monster fern be three times as high as the pigeon plant?

FIND OUT
- What is the question you have to answer? *In how many days will the monster fern be three times as high as the pigeon plant?*
- What does the Goofy Gardener have? *Strange plants in his greenhouse*
- How much do his pigeon plants grow each day? *1 foot*
- How much do his monster ferns grow each day? *2 feet*
- How high is his pigeon plant today? *1 foot*
- How high is his monster fern today? *7 feet*

CHOOSE A STRATEGY
- Would it help to keep track of how much each plant grows each day? *Yes*
- The symbol at the top of your sheet means that making a table can help solve this problem.

SOLVE IT
- How many rows do you need in your table? *2*
- What are you keeping track of in the first row? *The pigeon plant*
- What are you keeping track of in the second row? *The monster fern*
- What number goes in the first column for the pigeon plant? *1*
- What number goes in the first column for the monster fern? *7*
- What numbers go in the second column? *2 for the pigeon plant, 9 for the monster fern*
- What are you looking for in each column? *The number for the monster fern to be three times as big as the number for the pigeon plant*
- Keep adding numbers to the table, until you find the column with the right numbers. In how many days will the monster fern be three times as high as the pigeon plant? *4*

Solution: 4

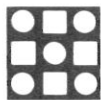| pigeon plant	1	2	3	4	5
monster fern	7	9	11	13	15

LOOK BACK
- Read the problem again. Look at the information given and the main question. Review your table. Is your answer reasonable?

EXTEND IT
- When will the monster fern be 2½ times as high as the pigeon plant?

PRACTICE
- Similar Practice Problems: 58, 80, 96

21 "The Monsters of Muzz" opened on Monday. The first day there were 25 people who saw the movie. Word got out and on the second day 17 more people came than on the first day, so that 67 people had seen the movie after the second day. On the third day 59 people came, 17 more than on the second day. If each day 17 more people saw the movie than the day before, on what day would 500 people have seen the movie?

FIND OUT
- What is the question you have to answer?
- How many people saw the movie on the first day?
- How many people came the second day? How many more people saw the movie on the second day than on the first day?
- At the end of the second day, how many people had seen the movie?
- How many people came the third day? How many more people saw the movie on the third day than on the second day?
- How many more people came each day than the day before?

CHOOSE A STRATEGY
- Circle to show what you choose.

SOLVE IT
- If you set up a table, how many rows do you need?
- What are you keeping track of in the first row? second row? third row?
- What is the pattern in the number of people who came to see the movie? Can you use the pattern to help you fill in the table?
- How many people came to see the movie on the fourth day? At the end of the fourth day, how many people had seen the movie altogether?
- Keep filling in the table. On what day did the 500th person see the movie?

Day	1	2	3	4
Number for Day	25	42		
Total		67		

LOOK BACK
- Read the problem again. Look at the information given and the main question. Review your work. Is your answer reasonable?

21   "The Monsters of Muzz" opened on Monday. The first day there were 25 people who saw the movie. Word got out and on the second day 42 people came, 17 more people than on the first day. At the end of the second day 67 people had seen the movie. On the third day 59 people came, 17 more than on the second day. If each day 17 more people saw the movie than the day before, on what day would 500 people have seen the movie?

FIND OUT
- What is the question you have to answer? *On what day would 500 people have seen the movie?*
- How many people saw the movie on the first day? *25*
- How many people came the second day? *42* How many more people saw the movie on the second day than on the first day? *17*
- At the end of the second day, how many people had seen the movie? *67*
- How many people came the third day? *59* How many more people saw the movie on the third day than on the second day? *17*
- How many more people came each day than the day before? *17*

CHOOSE A STRATEGY
- Can you use the information you have about how many more people came to the movie each day to help solve the problem? *Yes*
- The symbol at the top of your sheet suggests using or looking for a pattern. Is there another strategy you want to use with this? *Yes, we can use a table to keep track of the number of people who saw the movie.*

SOLVE IT
- If you set up a table, how many rows do you need? *3*
- What are you keeping track of in the first row? *The day* second row? *The number who come that day* third row? *The total number who have seen the movie*
- What is the pattern in the number of people who came to see the movie? *17 more people each day than the day before* Can you use the pattern to help you fill in the table? *Yes*
- How many people came to see the movie on the fourth day? *76* At the end of the fourth day, how many people had seen the movie altogether? *202*
- Keep filling in the table. On what day would 500 people have seen the movie? *7*

Solution: 7

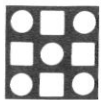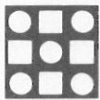| Day	1	2	3	4	5	6	7
Number for Day	25	42	59	76	93	110	127
Total	25	67	126	202	295	405	532

LOOK BACK
- Read the problem again. Look at the information given and the main question. Review your work. Is your answer reasonable?

EXTEND IT
- On what day would 1000 people have seen the movie?

22 Celia's mother is running for Mayor. Elena and Celia are handing out buttons for Celia's mother. They start the first day with 500 buttons and hand out 50 buttons. On the second day they hand out 62 buttons, 12 more than the first day. On the third day they hand out 74 buttons, 12 more than the second day. If they hand out all the buttons at this rate, how many days will it take them?

FIND OUT
- What is the question you have to answer?
- What are Elena and Celia doing?
- How many buttons do they hand out on the first day?
- How many buttons do they hand out on the second day?
- How many more buttons do they hand out on the second day than on the first day?
- How many buttons do they hand out on the third day?
- How many more buttons do they hand out each day than the day before?

CHOOSE A STRATEGY
- Circle to show what you choose.

SOLVE IT
- If you set up a table, how many rows do you need?
- What are you keeping track of in the first row? second row? third row?
- What is the pattern in the number of buttons they hand out?
- Can you use the pattern to help you fill in the table?
- How many buttons did they hand out on the fourth day? After the fourth day how many buttons had they given out altogether?
- Keep using the pattern to fill in the table. How many days will it take them?

Day	1	2
Buttons Handed Out	50	62
Total	50	

LOOK BACK
- Read the problem again. Look at the information given and the main question. Review your work. Is your answer reasonable?

22 Celia's mother is running for Mayor. Elena and Celia are handing out buttons for Celia's mother. They start the first day with 500 buttons and hand out 50 buttons. On the second day they hand out 62 buttons, 12 more than the first day. On the third day they hand out 74 buttons, 12 more than the second day. If they hand out all the buttons at this rate, how many days will it take them?

FIND OUT
- What is the question you have to answer? *How many days will it take them to hand out the buttons?*
- What are Elena and Celia doing? *Handing out buttons for Celia's mother*
- How many buttons do they hand out on the first day? *50*
- How many buttons do they hand out on the second day? *62*
- How many more buttons do they hand out on the second day than on the first day? *12*
- How many buttons do they hand out on the third day? *74*
- How many more buttons do they hand out each day than the day before? *12*

CHOOSE A STRATEGY
- Can you use the information you have about how many more buttons they handed out each day to help solve the problem? *Yes*
- The symbol at the top of your sheet suggests using or looking for a pattern. Is there another strategy you want to use with this? *Yes, we can make a table and keep track of the buttons that are handed out.*

SOLVE IT
- If you set up a table, how many rows do you need? *3*
- What are you keeping track of in the first row? *The day* second row? *The number of buttons handed out that day* third row? *The total number of buttons handed out*
- What is the pattern in the number of buttons they hand out? *12 more each day*
- Can you use the pattern to help you fill in the table? *Yes, we can just make the number larger by 12 each day.*
- How many buttons did they hand out on the fourth day? *86* After the fourth day how many buttons had they given out altogether? *272*
- Keep using the pattern to fill in the table. How many days will it take them? *7*

Solution: 7

Day	1	2	3	4	5	6	7
Buttons Handed Out	50	62	74	86	98	110	20 left
Total	50	112	186	272	370	480	

LOOK BACK
- Read the problem again. Look at the information given and the main question. Review your work. Is your answer reasonable?

EXTEND IT
- If they had 1000 buttons, and they handed out 40 the first day, and then 17 more each day than the day before, how many days would it take them to hand out 1000 buttons?

PRACTICE
- Similar Practice Problems: 60, 73, 109

23 Ingrid and Kirsten are making the art room very colorful. They are painting one wall with squares of red, green, blue, and yellow. They divided the wall into 4 columns with 4 rows. Before painting they marked each square with an R, G, B, or Y. They didn't want any color to be repeated in the same row or in the same column. How did Ingrid and Kirsten arrange the colors in the squares on the wall?

FIND OUT
- What is the question you have to answer?
- What are Ingrid and Kirsten doing?
- How many different colors are they using?
- How did they divide up the wall?
- What are the conditions for putting the colors in the squares?

CHOOSE A STRATEGY
- Circle to show what you choose.

SOLVE IT
- If you cut up pieces of paper for the colors, how many pieces of paper do you need? How are you going to mark the pieces of paper?
- Use a diagram of the wall. Try putting colors in the first row. How did you arrange the colors?
- Now fill in row 2. Do you need to move any of the colors?
- Fill in the rest of the squares with pieces of paper. Change the colors around until there are different colors in each column and each row.

R	G		

LOOK BACK
- Read the problem again. Look at the information given and the main question. Review your work. Is your answer reasonable?

The Problem Solver 4   T•45   © 1987 Creative Publications

23 Ingrid and Kirsten are making the art room very colorful. They are painting one wall with squares of red, green, blue, and yellow. They divided the wall into 4 columns with 4 rows. Before painting they marked each square with an R, G, B, or Y. They didn't want any color to be repeated in the same row or in the same column. How did Ingrid and Kirsten arrange the colors in the squares on the wall?

FIND OUT
- What is the question you have to answer? *How did Ingrid and Kirsten arrange the colors in the squares on the wall?*
- What are Ingrid and Kirsten doing? *Painting the wall in the art room*
- How many different colors are they using? *4*
- How did they divide up the wall? *4 columns and 4 rows*
- What are the conditions for putting the colors in the squares? *They can't repeat a color in a row or column* (You might want to talk about what "conditions" means.)

CHOOSE A STRATEGY
- Would it help to have pieces of paper for the colors and be able to move them around? *Yes*
- The symbol at the top of your sheet suggests acting out or using objects to help solve the problem. Is there another strategy that you need to use with this? *We need to have a diagram of the wall, so we can arrange the pieces of paper on it.*

SOLVE IT
- If you cut up pieces of paper for the colors, how many pieces of paper do you need? *16* How are you going to mark the pieces of paper? *R - 4 times, G - 4 times, B - 4 times, Y - 4 times*
- Use a diagram of the wall. Try putting colors in the first row. How did you arrange the colors? *R-G-B-Y*
- Now fill in row 2. How did you arrange the colors? *G-R-Y-B*
- Fill in the rest of the squares with pieces of paper. Change the colors around until there are different colors in each column and each row.
- Is there more than one way that Ingrid and Kirsten could have painted the wall? *Yes*

Solution:

R	G	B	Y
Y	B	G	R
G	R	Y	B
B	Y	R	G

LOOK BACK
- Read the problem again. Look at the information given and the main question. Review your work. Is your answer reasonable?

24 Ashley is a spy and she knows she is being watched. This week she has to meet with 5 spies: A, B, C, D, and E. She has to meet with each spy for one hour every day and she wants to make sure that she doesn't meet with the same spy at the same hour on any other day of the week. She will meet with them between 9:00 and 2:00. What is one way Ashley could meet with the spies this week?

FIND OUT
- What is the question you have to answer?
- What does Ashley have to do?
- How many spies are there?
- How many times does Ashley have to meet with each of them?
- What are the conditions for Ashley meeting with the spies?

CHOOSE A STRATEGY
- Circle to show what you choose.

SOLVE IT
- If you cut up pieces of paper for the spies, how many pieces of paper do you need? How are you going to mark the pieces of paper?
- If you make a diagram of the week, what do you want to put at the top of the columns? by the rows?
- Try filling in the first row. How did you arrange the spies?
- Fill in the next row. How did you arrange the spies?
- Keep filling in the rows. Move the papers around if you need to, until you have different spies in each column and each row.
- Is there more than one way that Ashley could have met with the spies?

	M	T	W	Th	F
9:00	A	B			
10:00					
11:00					
12:00					
1:00					

LOOK BACK
- Read the problem again. Look at the information given and the main question. Review your work. Is your answer reasonable?

24 Ashley is a spy and she knows she is being watched. This week she has to meet with 5 spies: A, B, C, D, and E. She has to meet with each spy for one hour every day and she wants to make sure that she doesn't meet with the same spy at the same hour on any other day of the week. She will meet with them between 9:00 and 2:00. What is one way Ashley could meet with the spies this week?

FIND OUT
- What is the question you have to answer? *What is one way Ashley could meet with the spies this week?*
- What does Ashley have to do? *Meet with each spy every day during the week*
- How many spies are there? *5*
- How many times does Ashley have to meet with each of them? *5 times*
- What are the conditions for Ashley meeting with the spies? *She has to meet with each spy at a different time each day.*

CHOOSE A STRATEGY
- Would it help to cut up pieces of paper for the spies and then be able to move them around? *Yes*
- The symbol at the top of your page means to act out or use objects to help solve the problem. Is there another strategy that you can use? *Yes, we need a table to show the days and times.*

SOLVE IT
- If you cut up pieces of paper for the spies, how many pieces of paper do you need? *25* How are you going to mark the pieces of paper? *A - 5, B - 5, C - 5, D - 5, E - 5*
- If you make a diagram of the week, what do you want to put at the top of the columns? *The days of the week* by the rows? *One hour periods, beginning with 9:00*
- Try filling in the first row. How did you arrange the spies? *A-B-C-D-E*
- Fill in the next row. How did you arrange the spies? *B-A-E-D-C* Do you have to move any of the pieces of paper? *Yes, D is in the same column twice*
- Keep filling in the rows. Move the papers around if you need to, until you have spies in different positions in each column and each row.
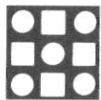- Is there more than one way that Ashley could have met with the spies? *Yes*

Solution:

	M	T	W	Th	F
9:00	A	B	C	D	E
10:00	E	C	A	B	D
11:00	B	E	D	C	A
12:00	D	A	B	E	C
1:00	C	D	E	A	B

LOOK BACK
- Read the problem again. Look at the information given and the main question. Review your work. Is your answer reasonable?

PRACTICE
- Similar Practice Problems: 61, 83, 97

25 In Furland, the king of the Fuzzies was sad to hear that there was an outbreak of flu. On the first day 58 Fuzzies came down with the flu. On the second day 68 Fuzzies got sick, and 60 got sick on the third day. On the fourth day 70 Fuzzies got sick, and 62 new cases were reported on the fifth day. If the Fuzzies kept getting the flu at this same rate, how many Fuzzies would come down with the flu on the 10th day?

FIND OUT
- What is the question you have to answer?
- What happened in Furland?
- How many Fuzzies got sick the first day? second day? third day? fourth day? fifth day?

CHOOSE A STRATEGY
- Circle to show what you choose.

SOLVE IT
- If you make a table to help you find a pattern, what do you want to keep track of?
- What are you going to put in the first row? second row?
- How many days can you fill in?
- What is the change from the first day to the second day? from the second day to the third day? from the third day to the fourth day? from the fourth day to the fifth day?
- Do you see a pattern in the changes? What is the pattern?
- Can you use the pattern to fill in more days in the table?
- How many Fuzzies get sick on the 10th day?

Day	1	2	3	
Fuzzies sick	58	68	60	

LOOK BACK
- Read the problem again. Look at the information given and the main question. Review your work. Is your answer reasonable?

25 In Furland, the king of the Fuzzies was sad to hear that there was an outbreak of flu. On the first day 58 Fuzzies came down with the flu. On the second day 68 Fuzzies got sick, and 60 got sick on the third day. On the fourth day 70 Fuzzies got sick, and 62 new cases were reported on the fifth day. If the Fuzzies kept getting the flu at this same rate, how many Fuzzies would come down with the flu on the 10th day?

FIND OUT
- What is the question you have to answer? *How many Fuzzies would get the flu on the 10th day?*
- What happened in Furland? *More and more Fuzzies are getting the flu.*
- How many Fuzzies got sick the first day? *58* second day? *68* third day? *60* fourth day? *70* fifth day? *62*

CHOOSE A STRATEGY
- Are there the same number of new cases of flu each day? *No* Would it help to look at how the numbers are increasing? *Yes*
- The symbol at the top of your sheet means that you use or look for a pattern. Is there another strategy you can use to help you find a pattern? *Yes, we can make a table and then look for a pattern.*

SOLVE IT
- If you make a table to help you find a pattern, what do you want to keep track of? *The days, and how many Fuzzies get sick*
- What are you going to put in the first row? *The day* second row? *The number of sick Fuzzies that day*
- How many days can you fill in? *5*
- What is the change from the first day to the second day? *10 more on the second day* from the second day to the third day? *8 fewer on the third day* from the third day to the fourth day? *10 more on the fourth day* from the fourth day to the fifth day? *8 fewer on the fifth day*
- Do you see a pattern in the changes? *Yes* What is the pattern? *First there are 10 more, then 8 fewer.*
- Can you use the pattern to fill in more days in the table? *Yes*
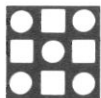- How many Fuzzies get sick on the 10th day? *76*

Solution: 76

Day	1	2	3	4	5	6	7	8	9	10	
Fuzzies sick	58	68	60	70	62	72	64	74	66	76	

LOOK BACK
- Read the problem again. Look at the information given and the main question. Review your work. Is your answer reasonable?

EXTEND IT
- How many Fuzzies would come down with the flu on the 20th day?

26 Yolanda and Willie found that they were getting more and more snails in their garden. On the first day they counted 9 snails, then on the second day there were 17. On the third day they counted 24, 32 on the fourth day, and 39 on the fifth day. On what day did they count more than 90 snails?

FIND OUT
- What is the question you have to answer?
- What are Yolanda and Willie doing?
- How many snails did they count on the first day? second day? third day? fourth day? fifth day?

CHOOSE A STRATEGY
- Circle to show what you choose.

SOLVE IT
- If you make a table to help you look for a pattern, what do you want to keep track of?
- What do you want to put in the first row? second row?
- How many days can you fill in?
- What is the change in the number of snails from the first day to the second day? from the second day to the third day? from the third day to the fourth day? from the fourth day to the fifth day?
- Do you see a pattern in the changes? What is the pattern?
- Can you use the pattern to fill in more of the table?
- On what day did they count more than 90 snails?

Day	1	2		
Snails	9	17		

LOOK BACK
- Read the problem again. Look at the information given and the main question. Review your work. Is your answer reasonable?
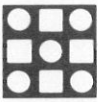
26 Yolanda and Willie found that they were getting more and more snails in their garden. On the first day they counted 9 snails, then on the second day there were 17. On the third day they counted 24, 32 on the fourth day, and 39 on the fifth day. On what day did they count more than 90 snails?

FIND OUT
- What is the question you have to answer? *On what day did they count more than 90 snails?*
- What are Yolanda and Willie doing? *Counting snails in their garden*
- How many snails did they count on the first day? *9* second day? *17* third day? *24* fourth day? *32* fifth day? *39*

CHOOSE A STRATEGY
- Are there the same number of new snails each day? *No* If you look at the differences between the numbers, can you look for repetition? *Yes*
- The symbol at the top of your sheet means to use or look for a pattern. Is there another strategy that would help you to look for a pattern? *Yes, we can make a table and then look for a pattern in the table.*

SOLVE IT
- If you make a table to help you look for a pattern, what do you want to keep track of? *The days and the number of snails they counted each day.*
- What do you want to put in the first row? *The days* second row? *The number of snails*
- How many days can you fill in? *5*
- What is the change in the number of snails from the first day to the second day? *8 more* from the second day to the third day? *7 more* from the third to the fourth day? *8 more* from the fourth day to the fifth day? *7 more*
- Do you see a pattern in the changes? *Yes* What is the pattern? *First 8 more, then 7 more*
- Can you use the pattern to fill in more of the table? *Yes*
- On what day did they count more than 90 snails? *12*

Solution: 12

Day	1	2	3	4	5	6	7	8	9	10	11	12
Snails	9	17	24	32	39	47	54	62	69	77	84	92

LOOK BACK
- Read the problem again. Look at the information given and the main question. Review your work. Is your answer reasonable?

EXTEND IT
- On what day would they find more than 200 snails?

PRACTICE
- Similar Practice Problems: 64, 81, 100

27 Guests at the Shadow Inn have reported seeing ghosts in room F and in S, the attic room. In January, 7 people reported seeing a ghost in room F, and 7 people reported seeing a ghost in room S. In February, there were 12 reports for room F and 9 reports for room S. In March, 11 people reported a ghost in room F and 12 reported a ghost in room S. In April, there were 16 reports for room F and 14 for room S. And in May they had 15 reports for room F and 17 for room S. If the reports continued at this same rate, what would be the next month that they would have the same number of ghosts reported for room F and room S?

FIND OUT
- What is the question you have to answer?
- What is happening at the Shadow Inn?
- How many ghosts were reported in January? February? March? April? May?

CHOOSE A STRATEGY
- Circle to show what you choose.

SOLVE IT
- When you make a table, what do you want to keep track of? How many rows do you need?
- Do the reports increase by the same amount for either room F or room S?
- Look at the numbers for room F. What is the difference between January and February? between February and March? between March and April? between April and May?
- Do you see a pattern for room F? What is it?
- Look at the numbers for room S. What is the difference between January and February? between February and March? between March and April? between April and May?
- Do you see a pattern for room S? What is it?
- What is the next month where they would have the same number of ghosts reported for room F and room S?

	J	F	M	A
F	7	12		
S	7	9		

LOOK BACK
- Read the problem again. Look at the information given and the main question. Review your table. Is your answer reasonable?

27 Guests at the Shadow Inn have reported seeing ghosts in room F and in S, the attic room. In January, 7 people reported seeing a ghost in room F, and 7 people reported seeing a ghost in room S. In February, there were 12 reports for room F and 9 reports for room S. In March, 11 people reported a ghost in room F and 12 reported a ghost in room S. In April, there were 16 reports for room F and 14 for room S. And in May they had 15 reports for room F and 17 for room S. If the reports continued at this same rate, what would be the next month that they would have the same number of ghosts reported for room F and room S?

FIND OUT
- What is the question you have to answer? *What would be the next month that they would have the same number of ghosts reported for room F and room S?*
- What is happening at the Shadow Inn? *People are seeing ghosts in room F and S*
- How many ghosts were reported in January? *7 in F and S* February? *12 in F, 9 in S* March? 11 in F, 12 in S April? *16 in F, 14 in S* May? *15 in F, 17 in S*

CHOOSE A STRATEGY
- Would it help to keep track of what the reports are each month and then look at how the numbers change? *Yes*
- The symbol at the top of your sheet means that you can use or make a table to help solve the problem. What other strategy can you use with making a table? *We can look for a pattern.*

SOLVE IT
- When you make a table, what do you want to keep track of? *The month, the number of ghosts reported for room F and the number reported for S* How many rows do you need? *3*
- Do the reports increase by the same amount for either room F or room S? *No*
- Look at the numbers for room F. What is the difference between January and February? *5 more* between February and March? *1 less* between March and April? *5 more* between April and May? *1 less*
- Do you see a pattern for room F? *Yes* What is it? *First there are 5 more and then 1 less*
- Look at the numbers for room S. What is the difference between January and February? *2 more* February and March? *3 more* March and April? *2 more* April and May? *3 more*
- Do you see a pattern for room S? *Yes* What is it? *First 2 more, then 3 more*
- What is the next month where they would have the same number of reports for room F and room S? *August*

Solution: August

	J	F	M	A	M	Ju	July	A	
F	7	12	11	16	15	20	19	24	
S	7	9	12	14	17	19	22	24	

LOOK BACK
- Read the problem again. Look at the information given and the main question. Review your table. Is your answer reasonable?

EXTEND IT
- When will the guests at the Shadow Inn think they have seen a total of 500 ghosts?

28 Dr. Feather is trying to find out how many birds are feeding in the marsh. The first week he counts 5 long-necked farlings and 5 short-beaked fuzzlings. The next week he counts 10 farlings and 6 fuzzlings. In the third week he counts 14 farlings and 8 fuzzlings. In the fourth week he sees 19 farlings and 11 fuzzlings. At the end of the fifth week he counts 23 farlings and 15 fuzzlings. When did Dr. Feather count the same number of farlings and fuzzlings again, if the birds continue coming at the same rate?

FIND OUT
- What is the question you have to answer?
- What is Dr. Feather doing?
- How many farlings and fuzzlings does Dr. Feather count the first week? the second week? the third week? the fourth week? the fifth week?

CHOOSE A STRATEGY
- Circle to show what you choose.

SOLVE IT
- When you make a table, what do you want to keep track of? How many rows do you need? What are you putting in each row?
- Look at the numbers for the farlings. What is the difference between the first week and the second week? the second week and the third week? the third week and the fourth week? the fourth week and the fifth week?
- Do you see a pattern in the changes for the farlings? What is it?
- Look at the numbers for the fuzzlings. What is the difference between the first week and second week? second week and third week? third week and fourth week? fourth week and fifth week?
- Do you see a pattern in the changes for the fuzzlings? What is it?
- When will Dr. Feather count the same number of farlings and fuzzlings again?

Day	1	2	3	4
Farlings	5			
Fuzzlings	5			

LOOK BACK
- Read the problem again. Look at the information given and the main question. Review your table. Is your answer reasonable?

28 Dr. Feather is trying to find out how many birds are feeding in the marsh. The first week he counts 5 long-necked farlings and 5 short-beaked fuzzlings. The next week he counts 10 farlings and 6 fuzzlings. In the third week he counts 14 farlings and 8 fuzzlings. In the fourth week he sees 19 farlings and 11 fuzzlings. At the end of the fifth week he counts 23 farlings and 15 fuzzlings. When did Dr. Feather count the same number of farlings and fuzzlings again, if the birds continue coming at the same rate?

FIND OUT
- What is the question you have to answer? *When will Dr. Feather count the same number of farlings and fuzzlings again?*
- What is Dr. Feather doing? *Counting the farlings and fuzzlings that feed at the marsh*
- How many farlings and fuzzlings does Dr. Feather count the first week? *5 fuzzlings and 5 farlings* the second week? *10 farlings and 6 fuzzlings* the third week? *14 farlings and 8 fuzzlings* the fourth week? *19 farlings and 11 fuzzlings* the fifth week? *23 farlings and 15 fuzzlings*

CHOOSE A STRATEGY
- Would it help to keep track of the number of farlings and fuzzlings he counted each week and then look at how the numbers change each week? *Yes*
- The symbol at the top of your sheet means to use or make a table. Is there another strategy that you can use with making a table to help solve the problem? *Yes, we can look for a pattern after we make a table.*

SOLVE IT
- When you make a table, what do you want to keep track of? *The day and the number of birds he counted each day* How many rows do you need? *3* What are you going to put in each row? *First the day, second the number of farlings, third the number of fuzzlings*
- Look at the numbers for the farlings. What is the difference between the first week and the second week? *5 more* the second week and the third week? *4 more* the third week and the fourth week? *5 more* the fourth week and the fifth week? *4 more*
- Do you see a pattern in the differences for the farlings? *Yes* What is it? *First there are 5 more, then 4 more, and this repeats.*
- Look at the numbers for the fuzzlings. What is the difference between the first week and second week? *1 more* second week and third week? *2 more* third week and fourth week? *3 more* fourth week and fifth week? *4 more*
- Do you see a pattern in the differences for the fuzzlings? *Yes* What is it? *Each time the number is more by 1.*
- When will Dr. Feather count the same number of farlings and fuzzlings again? *The 9th week*

Solution: Week 9

Day	1	2	3	4	5	6	7	8	9
Farlings	5	10	14	19	23	28	32	37	41
Fuzzlings	5	6	8	11	15	20	26	33	41

LOOK BACK
- Read the problem again. Look at the information given and the main question. Review your table. Is your answer reasonable?

EXTEND IT
- When will Dr. Feather count a total of more than 500 birds?

PRACTICE
- Similar Practice Problems: 63, 85, 111

29 Heidi and Cathleen were trying to decide what kind of pet they wanted. They looked at a lot of animals at Morgan's Pet Store. They looked at 3 more rabbits than birds. They saw one half as many birds as kittens. There were one third as many kittens as puppies. They took a long look at the 36 adorable puppies. How many animals did they look at altogether?

FIND OUT
- What is the question you have to answer?
- What are Heidi and Cathleen doing at the store?
- What do you know about the number of rabbits that they looked at?
- What do you know about the number of birds that they looked at?
- What do you know about the number of kittens that they looked at?
- What do you know about the number of puppies that they looked at?

CHOOSE A STRATEGY
- Circle to show what you choose.

SOLVE IT
- You have a total number for one kind of pet they looked at, which one?
- Where is the information about the puppies in the problem?
- If you work backwards, what is the animal that comes before the puppies? How can you find out how many they looked at?
- Working backwards, what is the animal that comes before the kittens in the problem? How can you find out how many they looked at?
- Work all the way backwards to the beginning of the problem. How many animals did they look at altogether?

LOOK BACK
- Read the problem again. Look at the information given and the main question. Review your work. Is your answer reasonable?

29 Heidi and Cathleen were trying to decide what kind of pet they wanted. They looked at a lot of animals at Morgan's Pet Store. They looked at 3 more rabbits than birds. They saw one half as many birds as kittens. There were one third as many kittens as puppies. They took a long look at the 36 adorable puppies. How many animals did they look at altogether?

FIND OUT
- What is the question you have to answer? *How many animals did they look at altogether?*
- What are Heidi and Cathleen doing at the store? *Trying to pick out a pet at Morgan's Pet Store*
- What do you know about the number of rabbits that they looked at? *There were 3 more rabbits than birds.*
- What do you know about the number of birds that they looked at? *They saw one half as many birds as kittens.*
- What do you know about the number of kittens that they looked at? *There were one third as many kittens as puppies.*
- What do you know about the number of puppies that they looked at? *There were 36 puppies.*

CHOOSE A STRATEGY
- The symbol at the top of your page means to work backwards through the problem. Begin with the definite information you have and work backwards.

SOLVE IT
- You have a total number for one kind of pet they looked at, which one? *The puppies*
- Where is the information about the puppies in the problem? *At the end*
- If you work backwards, what is the animal that comes before the puppies? *Kittens* How can you find out how many they looked at? *We know there are one third as many kittens as puppies, so there must be 12 kittens.*
- Working backwards, what is the animal that comes before the kittens in the problem? *Birds* How can you find out how many they looked at? *We know there are one half as many birds as kittens, and we know there are 12 kittens, so there must be 6 birds.*
- Work all the way backwards to the beginning of the problem. How many animals did they look at altogether? *63*

Solution: 63

$$\begin{aligned}
&36 \text{ puppies} \\
\tfrac{1}{3} \text{ kittens} &= 12 \\
\tfrac{1}{2} \text{ birds} &= 6 \\
3 \text{ more rabbits} &= 9 \\
\text{Total} &= 63
\end{aligned}$$

LOOK BACK
- Read the problem again. Look at the information given and the main question. Review your work. Is your answer reasonable?

EXTEND IT
- If there were 48 puppies at the pet store, how many animals would they look at altogether?
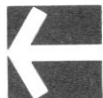
30 North Park was filled with people one Saturday. There were one third as many people skateboarding as there were biking. There were twice as many people biking as there were skating. There were one fourth as many people skating as there were playing softball. North Park was a popular place for softball. There were 60 people playing softball. How many people were skateboarding, biking, and skating?

FIND OUT
- What is the question you have to answer?
- What was happening at North Park?
- What do you know about the number of people skateboarding?
- What do you know about the number of people biking?
- What do you know about the number of people skating?
- What do you know about the number of people playing softball?

CHOOSE A STRATEGY
- Circle to show what you choose.

SOLVE IT
- You have a definite number of people for one sport at the park, which sport is that?
- Where does the definite number you are given come in the problem?
- If you work backwards from the information you have, what comes before this? How can you figure out how many people are doing that?
- Work backwards again. What comes before this? How can you find out how many people are doing that?
- Keep working backwards. How many people were skateboarding, biking, and skating?

LOOK BACK
- Read the problem again. Look at the information given and the main question. Review your work. Is your answer reasonable?

30 North Park was filled with people one Saturday. There were one third as many people skateboarding as there were biking. There were twice as many people biking as there were skating. There were one fourth as many people skating as there were playing softball. North Park was a popular place for softball. There were 60 people playing softball. How many people were skateboarding, biking, and skating?

FIND OUT
- What is the question you have to answer? *How many people were skateboarding, biking, and skating?*
- What was happening at North Park? *People were playing softball, skateboarding, biking, and skating*
- What do you know about the number of people skateboarding? *There were one third as many people skateboarding as were biking.*
- What do you know about the number of people biking? *There were twice as many people biking as there were skating.*
- What do you know about the number of people skating? *There were one fourth as many people skating as there were playing softball.*
- What do you know about the number of people playing softball? *There were 60 people playing softball.*

CHOOSE A STRATEGY
- The symbol at the top of your sheet means that working backwards will help solve the problem.

SOLVE IT
- You have a definite number of people for one sport at the park, which sport is that? *Softball*
- Where does the definite number you are given come in the problem? *At the end*
- If you work backwards from the information you have, what comes before this? *The people skating* How can you figure out how many people are doing that? *We know there are one fourth the number skating as there are playing softball, so that means there are 15 people skating.*
- Work backwards again. What comes before this? *People biking* How can you find out how many people are doing that? *We know there are twice as many people biking as there are skating, and now we know there are 15 people skating. Then there must be 30 people biking.*
- Keep working backwards. How many people were skateboarding, biking, and skating? *55*

  Solution: 55

  $$60\text{-softball}$$
  $$\tfrac{1}{4}\ \text{skating} = 15$$
  $$2 \times \text{biking} = 30$$
  $$\tfrac{1}{3}\ \text{skateboarding} = 10$$

LOOK BACK
- Read the problem again. Look at the information given and the main question. Review your work. Is your answer reasonable?

EXTEND IT
- If there were 96 people playing softball, how many people would be skateboarding, biking, and skating?

PRACTICE
- Similar Practice Problems: 59, 72, 86

31 The big old house in the center of town was called the House of Stairs. Years ago, someone who was crazy about stairs built the house with 4 different stairways from the first floor to the second floor, and 5 different stairways from the second floor to the third floor. How many different ways could you get to the third floor from the first floor in the House of Stairs?

FIND OUT
- What is the question you have to answer?
- What was the House of Stairs?
- How many stairways went from the first floor to the second floor? from the second floor to the third floor?

CHOOSE A STRATEGY
- Circle to show what you choose.

SOLVE IT
- If you make a picture of the House of Stairs, how many floors does it have?
- How many stairways do you need to show from the first floor to the second floor? from the second floor to the third floor?
- Begin with one stairway from the first floor to the second floor. Then how many choices do you have from the second floor to the third floor? Using the first stairway from the first floor to the second floor, how many ways can you go on up to the third floor?
- Do the same thing with each of the other stairways from the first floor to the second floor. How many different ways are there for each of the 4 stairways? If you add all the different ways together, how many ways are there from the first floor to the third floor?
- Can you also multiply the number of stairways from the first floor to the second floor times the number of stairways from the second floor to the third floor?
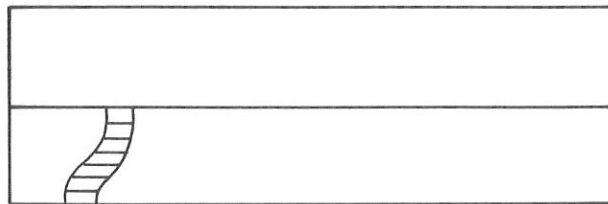
LOOK BACK
- Read the problem again. Look at the information given and the main question. Review your picture. Is your answer reasonable?

31   The big old house in the center of town was called the House of Stairs. Years ago, someone who was crazy about stairs built the house with 4 different stairways from the first floor to the second floor, and 5 different stairways from the second floor to the third floor. How many different ways could you get to the third floor from the first floor in the House of Stairs?

FIND OUT
- What is the question you have to answer? *How many different ways could you get to the third floor from the first floor in the House of Stairs?*
- What was the House of Stairs? *An old house with lots of stairways*
- How many stairways went from the first floor to the second floor? *4* from the second floor to the third floor? *5*

CHOOSE A STRATEGY
- Would it help to make a picture of the House of Stairs? *Yes*
- The symbol at the top of your sheet means to make a picture or diagram to help solve the problem.

SOLVE IT
- If you make a picture of the House of Stairs, how many floors does it have? *3*
- How many stairways do you need to show from the first floor to the second floor? *4* from the second floor to the third floor? *5*
- Begin with one stairway from the first floor to the second floor. How many choices do you have from the second floor to the third floor? *5* Using the first stairway from the first floor to the second floor, how many ways can you go on up to the third floor? *5*
- Do the same thing with each of the other stairways from the first floor to the second floor. How many different ways are there for each of the 4 stairways? *5* If you add all the different ways together, how many ways are there from the first floor to the third floor? *5 + 5 + 5 + 5 = 20*
- Can you also multiply the number of stairways from the first floor to the second floor times the number of stairways from the second floor to the third floor? *Yes, 4 × 5 = 20*

Solution: 20
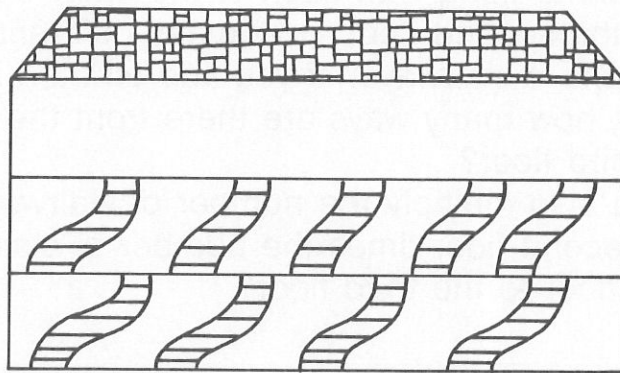
LOOK BACK
- Read the problem again. Look at the information given and the main question. Review your picture. Is your answer reasonable?

EXTEND IT
- If there are 6 doors into the same house, how many ways can you get from outside the house to the third floor?

32 Hugo the Horrible lived in a castle with a moat around it. Anyone who had to see him could enter the castle yard over 3 different drawbridges. From the castle yard they could enter the castle through 4 different gates. Finally, they could go into Hugo's throne room through 3 different doors. How many different ways could some poor unfortunate person take from outside the moat to Hugo's throne room?

FIND OUT
- What is the question you have to answer?
- Where does Hugo the Horrible live?
- How many drawbridges are there over Hugo's moat?
- How many gates are there into Hugo's castle?
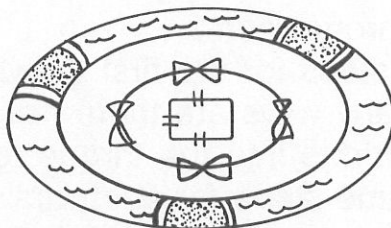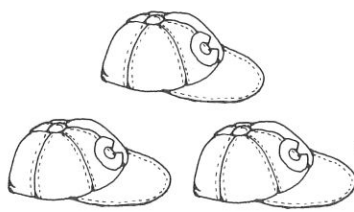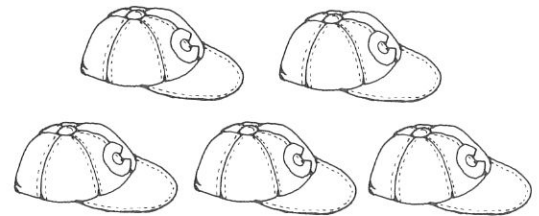- How many doors are there into Hugo's throne room?

CHOOSE A STRATEGY
- Circle to show what you choose.

SOLVE IT
- If you make a picture of Hugo's castle, how many drawbridges do you need to show? how many gates? how many doors?
- Begin with one drawbridge. Go through one gate, and pick one door into the throne room. Now go through the same drawbridge, the same gate, and pick another door to the throne room. How many ways are there through the first drawbridge, the first gate, and into the throne room?
- Now begin with the first drawbridge again, and pick a second gate. Go through the same steps with the second gate. How many ways are there through the first drawbridge, second gate, and into the throne room?
- Repeat these steps for the first drawbridge and each of the gates. How many ways are there from outside the moat through the first drawbridge into the throne room?
- Repeat the same steps for each drawbridge. How many different ways are there for each drawbridge? If you add them all together, how many different ways are there from outside the moat to Hugo's throne room?

LOOK BACK
- Read the problem again. Look at the information given and the main question. Review your picture. Is your answer reasonable?

33   At Hilary's Hats:

cost the same as

If   costs $3.50, then what does   cost?

FIND OUT
- What is the question you have to answer?
- What costs the same as 5 baseball caps?
- What costs $3.50?

CHOOSE A STRATEGY
- Circle to show what you choose?
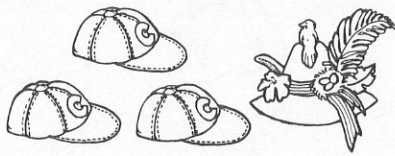

SOLVE IT
- If you use working backwards along with logical reasoning, what are you given the cost of? Where is the information in the problem?
- If you work backwards, you come to the cost of 5 baseball caps. If you know the cost of one of these, then can you find the cost of 5? What is the cost of 5?
- If you work backwards again, you come to one 1 hat and 3 baseball caps. If you know the cost of one baseball cap, then can you find the cost of 3 baseball caps? What is it?
- If you subtract the cost of 3 baseball caps from 5 baseball caps then what do you have left? Is this the cost of the hat?
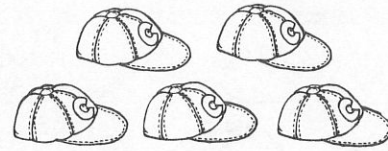
LOOK BACK
- Read the problem again. Look at the information given and the main question. Review your work. Is your answer reasonable?

33   At Hilary's Hats:

cost the same as

If [cap] costs $3.50, then what does [feathered hat] cost?

FIND OUT
- What is the question you have to answer? *If a baseball cap costs $3.50, then what does a hat cost?*
- What costs the same as 5 baseball caps? *3 baseball caps and 1 hat*
- What costs $3.50? *1 baseball cap*

CHOOSE A STRATEGY
- The symbol at the top of your page means to use logical thinking to help solve this problem. This kind of thinking includes if...then statements. If one thing is true or false, then something else is true or false.
- Is there another strategy that would be helpful with the logical thinking? *Yes, we can work backwards.*

SOLVE IT
- If you use working backwards along with logical reasoning, what are you given the cost of? *A baseball cap* Where is the information in the problem? *At the end*
- If you work backwards, you come to the cost of 5 baseball caps. If you know the cost of one of these, then can you find the cost of 5? *Yes* What is the cost of 5? *$17.50*
- If you work backwards again, you come to one 1 hat and 3 baseball caps. If you know the cost of one baseball cap, then can you find the cost of 3 baseball caps? *Yes* What is it? *$10.50*
- If you subtract the cost of 3 baseball caps from 5 baseball caps then what do you have left? *$7.00* Is this the cost of the hat? *Yes*
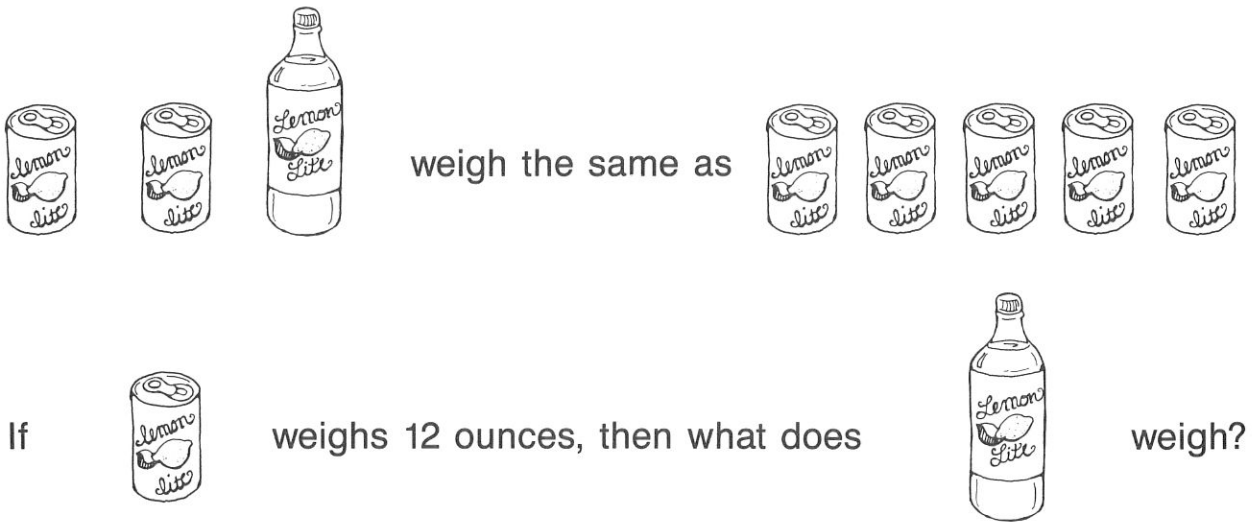
Solution: $7.00

LOOK BACK
- Read the problem again. Look at the information given and the main question. Review your work. Is your answer reasonable?

EXTEND IT
- If the baseball cap costs $5.64, then what would the hat cost?

34 There are cans and bottles of Lemon Lite at the store.

weigh the same as

If [can] weighs 12 ounces, then what does [bottle] weigh?

FIND OUT
- What is the question you have to answer?
- What weighs the same as 5 cans?
- What weighs 12 ounces?

CHOOSE A STRATEGY
- Circle to show what you choose.

SOLVE IT
- What do you know the weight of?
- If you work backwards, you come to 5 cans. If you know the weight of 1 can, then can you find the weight of 5 cans? What is it?
- If you work backwards again, you have 2 cans along with 1 bottle. If you know the weight of 1 can, then can you find the weight of 2 cans? What is it?
- If you subtract the weight of the 2 cans from the 5 cans, then what is left? Is this the weight of the bottle?

LOOK BACK
- Read the problem again. Look at the information given and the main question. Review your work. Is your answer reasonable?

34   There are cans and bottles of Lemon Lite at the store.

weigh the same as

If   weighs 12 ounces, then what does   weigh?

FIND OUT
- What is the question you have to answer? *If the can weighs 12 ounces, then what does the bottle weigh?*
- What weighs the same as 5 cans? *2 cans and 1 bottle*
- What weighs 12 ounces? *1 can*

CHOOSE A STRATEGY
- The symbol at the top of your page means to use logical thinking to help solve this problem. This kind of thinking includes saying that if one thing is true or false, then something else is true or false.
- Is there another strategy that would be helpful with this problem? *Yes, we can work backwards.*
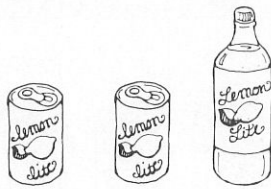
SOLVE IT
- What do you know the weight of? *1 can*
- If you work backwards, you come to 5 cans. If you know the weight of 1 can, then can you find the weight of 5 cans? *Yes* What is it? *60 ounces*
- If you work backwards again, you have 2 cans along with 1 bottle. If you know the weight of 1 can, then can you find the weight of 2 cans? *Yes* What is it? *24 ounces*
- If you subtract the weight of the 2 cans from the 5 cans, then what is left? *36 ounces* Is this the weight of the bottle? *Yes*

    Solution: 36 ounces

LOOK BACK
- Read the problem again. Look at the information given and the main question. Review your work. Is your answer reasonable?

EXTEND IT
- If the can weighs 9½ ounces, then what does the bottle weigh?

PRACTICE
- Similar Practice Problems: 62, 87, 101

35 Big Burger is giving away gold and silver coupons. The gold coupons are worth 15 points and the silver coupons are worth 10 points. Owen is saving coupons so he can get free Super-Big Burgers. So far Owen has 16 coupons worth 215 points. How many gold coupons and how many silver coupons does Owen have?

FIND OUT
- What is the question you have to answer?
- What is the Big Burger doing?
- What are the two kinds of coupons that Owen is saving?
- How many coupons does Owen have?
- What are the coupons worth?

CHOOSE A STRATEGY
- Circle to show what you choose.

SOLVE IT
- When you set up a list, you need two columns. What are you keeping track of in each column?
- What do you want to keep track of in each row?
- What are you going to put in the first row? in the second row?
- Fill in more rows of your list. If you add some coupons from one column with coupons from the other, what two totals are you looking for? If you add four 15-point coupons with six 10-point coupons, will this be the same number of coupons that Owen has? If you add eight 15-point coupons with eight 10-point coupons, is this the right number of coupons? How much are these coupons worth?
- What are some more combinations of numbers from both columns that add up to 16 coupons?
- How many gold coupons and how many silver coupons does Owen have?

15 point	10 point
1—15	1—10
2—30	2—20
3—45	

LOOK BACK
- Read the problem again. Look at the information given and the main question. Review your list. Is your answer reasonable?

35 Big Burger is giving away gold and silver coupons. The gold coupons are worth 15 points and the silver coupons are worth 10 points. Owen is saving coupons so he can get free Super-Big Burgers. So far Owen has 16 coupons worth 215 points. How many gold coupons and how many silver coupons does Owen have?

FIND OUT
- What is the question you have to answer? *How many gold coupons and how many silver coupons does Owen have?*
- What is the Big Burger doing? *Giving away coupons*
- What are the two kinds of coupons that Owen is saving? *Gold and silver*
- How many coupons does Owen have? *16*
- What are Owen's coupons worth? *215 points*

CHOOSE A STRATEGY
- Would it help to make a list of coupons and what they are worth? *Yes*
- The symbol at the top of your sheet means to make an organized list.

SOLVE IT
- When you set up a list, you need two columns. What are you keeping track of in each column? *15-point and 10-point coupons*
- What do you want to keep track of in each row? *How many of each kind of coupon*
- What are you going to put in the first row? *1 - 15, 1 - 10 in the second row? 2 - 30, 2 - 20*
- Fill in more rows of your list. If you add some coupons from one column with coupons from the other, what two totals are you looking for? *16 coupons worth 215 points* If you add four 15-point coupons with six 10-point coupons, will this be the same number of coupons that Owen has? *No* If you add eight 15-point coupons with eight 10-point coupons, is this the right number of coupons? *Yes* How much are they worth? *200 points*
- What are some more combinations of numbers from both columns that add up to 16 coupons? *Ten 15-point with six 10-point, nine 15-point with seven 10-point*
- How many gold coupons and how many silver coupons does Owen have? *Eleven 15-point, five 10-point*

Solution: Eleven 15-point, five 10-point

15 point	10 point
1—15	1—10
2—30	2—20
3—45	3—30
4—60	4—40
5—75	5—50
6—90	6—60
7—105	7—70
8—120	8—80
9—135	9—90
10—150	10—100
11—165	11—110

LOOK BACK
- Read the problem again. Look at the information given and the main question. Review your list. Is your answer reasonable?

EXTEND IT
- If Owen had 20 coupons worth 255 points, how many silver and how many gold coupons would he have?

36 At the Halloween Carnival Tora is throwing balls at witches and ghosts. She gets 5 points for every witch she hits and she gets 8 points for every ghost. She can win a black cat by getting 100 points. Tora has hit 13 witches and ghosts altogether and she has 80 points. How many ghosts and how many witches did she hit?

FIND OUT
- What is the question you have to answer?
- What is Tora throwing balls at?
- How many points does she get for a ghost and how many points for a witch?
- How many witches and ghosts has Tora hit altogether?
- How many points does Tora have?

CHOOSE A STRATEGY
- Circle to show what you choose.

SOLVE IT
- When you set up a list, you need two columns. What are you keeping track of in each column?
- What do you want to keep track of in each row?
- What are you going to put in the first row? the second row?
- Fill in more rows of your list. If you add some points from one column with points from the other, what two totals are you looking for? If you add six witches with four ghosts, will this be the same number of things that Tora hit altogether? If you add six witches with seven ghosts, is this the right number of things? How many points would they be worth?
- What are some more combinations of numbers from both columns that add up to 13 ghosts and witches altogether?
- How many witches and how many ghosts did Tora hit?

witch	ghost
1—5	1—8
2—10	2—16
3—15	

LOOK BACK
- Read the problem again. Look at the information given and the main question. Review your list. Is your answer reasonable?

36   At the Halloween Carnival Tora is throwing balls at witches and ghosts. She gets 5 points for every witch she hits and she gets 8 points for every ghost. She can win a black cat by getting 100 points. Tora has hit 13 witches and ghosts altogether and she has 80 points. How many ghosts and how many witches did she hit?

FIND OUT
- What is the question you have to answer? *How many ghosts and how many witches did she hit?*
- What is Tora throwing balls at? *Witches and ghosts*
- How many points does she get for a ghost and how many points for a witch? *8 for a ghost and 5 for a witch*
- How many witches and ghosts has Tora hit altogether? *13*
- How many points does Tora have? *80*

CHOOSE A STRATEGY
- Would it help to write down how many points Tora could get for 1 ghost or witch, 2 ghosts or witches, and so on? *Yes*
- The symbol at the top of your sheet means to make an organized list to help solve the problem.

SOLVE IT
- When you set up a list, you need two columns. What are you keeping track of in each column? *The points for the witches and the points for ghosts*
- What do you want to keep track of in each row? *How many points for each number of ghosts or witches*
- What are you going to put in the first row? *1 - 8, 1 - 5* second row? *2 - 16, 2 - 10*
- Fill in more rows of your list. If you add some points from one column with points from the other, what two totals are you looking for? *13 ghosts and witches altogether, 80 points* If you add six witches with four ghosts, will this be the same number of things that Tora hit altogether? *No* If you add six witches with seven ghosts, is this the right number of things? *Yes* How many points would they be worth? *86*
- What are some more combinations of numbers from both columns that add up to 13 ghosts and witches altogether? *10 ghosts + 3 witches, 9 witches + 4 ghosts*
- How many witches and how many ghosts did Tora hit? *8 witches and 5 ghosts*

Solution: 8 witches, 5 ghosts

witch	ghost
1—5	1—8
2—10	2—16
3—15	3—24
4—20	4—32
5—25	(5)—40
6—30	6—48
7—35	7—56
(8)—40	8—64

LOOK BACK
- Read the problem again. Look at the information given and the main question. Review your work. Is your answer reasonable?
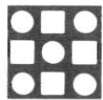
EXTEND IT
- If Tora hit 23 ghosts and witches altogether and had a total of 151 points, how many ghosts and how many witches did she hit?
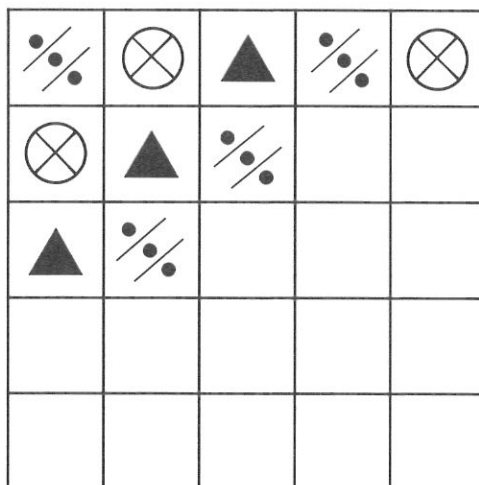
PRACTICE
- Similar Practice Problems: 65, 88, 113

37 Professor Mold was in an old tomb looking through his magnifying glass. He was looking at a picture on the wall. Look for a pattern in the picture. Can you fill in the empty squares?

⊘	⊗	▲	⊘	⊗
⊗	▲	⊘		
▲	⊘			

FIND OUT
- What is the question you have to answer?
- What did Professor Mold see?
- How many squares are in the picture?
- How many different shapes are in the squares? What are the different shapes?
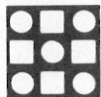
CHOOSE A STRATEGY
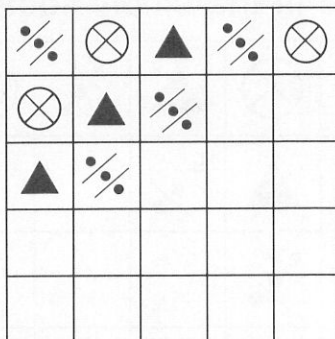- Circle to show what you choose.

SOLVE IT
- Look at the first row. Which shape comes first? second? third? fourth? fifth? Are some of the shapes repeated?
- Look at the second row. Which shape comes first? second? third? Are the shapes repeated in the same way as in the first row?
- Can you find a pattern?
- Fill in the rest of the squares in the picture.

LOOK BACK
- Read the problem again. Look at the information given and the main question. Review your work. Is your answer reasonable?

37 Professor Mold was in an old tomb looking through his magnifying glass. He was looking at a picture on the wall. Look for a pattern in the picture. Can you can fill in the empty squares?

FIND OUT
- What is the question you have to answer? *Can you fill in the empty squares?*
- What did Professor Mold see? *A picture on the wall*
- How many squares are in the picture? *25*
- How many different shapes are in the squares? *3* What are the shapes? *Dots and lines, a circle with lines, a triangle*

CHOOSE A STRATEGY
- Are the shapes repeated in the squares? *Yes*
- The symbol at the top of your sheet means to look for a pattern.

SOLVE IT
- Look at the first row. Which shape comes first? *The dots and lines* second? *The circle* third? *The triangle* fourth? *The dots and lines* fifth? *The circle* Are some of the shapes repeated? *Yes, the dots and lines and circle*
- Look at the second row. Which shape comes first? *The circle* second? *The triangle* third? *The dots and lines* Are the shapes repeated in the same way as in the first row? *They repeat in the same way but the row begins with a different shape.*
- How does the second row begin, compared to the first row? *The first row begins with the dots and lines, the second with the circle.*
- How does the third row begin, compared to the first and second rows? *This begins with the third shape in the first row.*
- Can you find a pattern? *Yes, the dots come first, then circle, then triangle and row one begins with the dots, then row two with the circle and then row three with the triangle, so row four will begin with the dots.*
- Fill in the rest of the squares in the picture.

Solution:
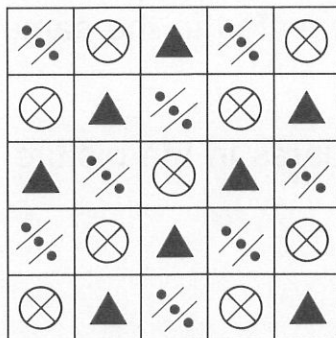
LOOK BACK
- Read the problem again. Look at the information given and the main question. Review your work. Is your answer reasonable?

38 Hugh is building steps out of big cement blocks. The first step is three blocks wide and one block high. He has already built three steps and is ready to add another step. How many blocks will he use altogether to build the four steps?
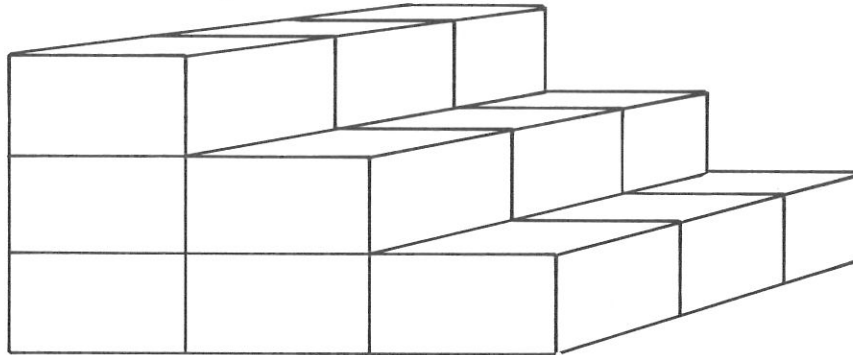
FIND OUT
- What is the question you have to answer?
- What is Hugh doing?
- How many blocks are in the first step?
- How many steps has Hugh built?
- How many steps will Hugh build altogether?

CHOOSE A STRATEGY
- Circle to show what you choose.

SOLVE IT
- Look at the first step. How many blocks are there in this step?
- Now look at the second step. How many blocks are in the second step? Can you see all the blocks that are in this step?
- Look at the third step. How many blocks are in this step?
- Do you see a pattern in the increase of blocks from step to step? What is the pattern?
- If he makes four steps, how many blocks will he use altogether?

LOOK BACK
- Read the problem again. Look at the information given and the main question. Review your work. Is your answer reasonable?

38

Hugh is building steps out of big cement blocks. The first step is three blocks wide and one block high. He has already built three steps and is ready to add another step. How many blocks will he use altogether to build the four steps?

FIND OUT
- What is the question you have to answer? *If he makes four steps, how many blocks will he use altogether?*
- What is Hugh doing? *Building steps*
- How many blocks are in the first step? *3*
- How many steps has Hugh built? *3*
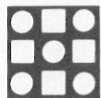- How many steps will Hugh build altogether? *4*

CHOOSE A STRATEGY
- The symbol at the top of your sheet means to look for a pattern to help solve this problem.
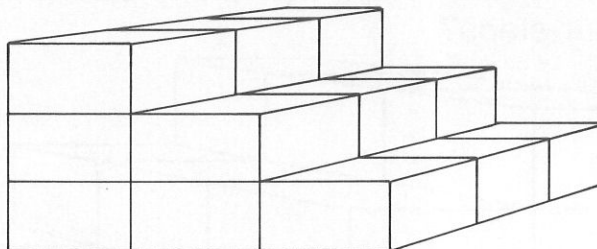
SOLVE IT
- Look at the first step. How many blocks are there in this step? *3*
- Now look at the second step. How many blocks are in the second step? *6* Can you see all the blocks that are in this step? *You can see 3 blocks, part of 1, and 2 are hidden*
- Look at the third step. How many blocks are in this step? *9*
- Do you see a pattern in the increase of blocks from step to step? *Yes* What is the pattern? *Each step is bigger by 3 blocks than the step before*
- If he makes four steps, how many blocks will he use altogether? *30*

Solution: 30

LOOK BACK
- Read the problem again. Look at the information given and the main question. Review your work. Is your answer reasonable?

EXTEND IT
- If Hugh added 7 more steps, how many blocks would he use altogether?

PRACTICE
- Similar Practice Problems: 69, 102, 118

39 Amelia, Gigi, Evan, and Collin were dreaming about the circus. They wanted to be an animal trainer, a clown, a juggler, and a trapeze artist. Gigi is training her dog to be a seeing-eye dog for the blind. Evan is always telling jokes, and Amelia is afraid of heights. Which job in the circus do you think each friend would choose?

FIND OUT
- What is the question you have to answer?
- Who is dreaming about the circus?
- Which jobs in the circus are they dreaming about?
- What do you know about Gigi? Evan? Amelia?

CHOOSE A STRATEGY
- Circle to show what you choose.

SOLVE IT
- If you make a table, how many columns do you need? how many rows?
- What do you want to keep track of in the columns? in the rows?
- Begin with Gigi. What is she doing? If she is training her dog, then which job in the circus do you think would be like this?
- If you can put a Y in one of the boxes for Gigi, then can you put an N in some of the other boxes? Which boxes can you put an N in?
- What does Evan always do? Does this give you a clue as to what job he might like in the circus?
- What do you know about Amelia? Does this give you a clue about a job that she would *not* have in the circus? How many jobs are left? Then what job do you think you could match with Amelia?
- Which job is left now? Is there someone left to match the job with?

	Gigi	Evan	Amelia	Collin
animal trainer	Y	N	N	N
juggler	N			
clown	N			
trapeze artist	N			

LOOK BACK
- Read the problem again. Look at the information given and the main question. Review your work. Is your answer reasonable?

39   Amelia, Gigi, Evan, and Collin were dreaming about the circus. They wanted to be an animal trainer, a clown, a juggler, and a trapeze artist. Gigi is training her dog to be a seeing-eye dog for the blind. Evan is always telling jokes, and Amelia is afraid of heights. Which job in the circus do you think each friend would choose?

FIND OUT
- What is the question you have to answer? *Which job in the circus do you think each friend would choose?*
- Who is dreaming about the circus? *Amelia, Gigi, Evan, and Collin*
- Which jobs in the circus are they dreaming about? *Animal trainer, clown, juggler, and trapeze artist*
- What do you know about Gigi? *She is training her dog to be a seeing-eye dog for the blind.* Evan? *He is always telling jokes.* Amelia? *She is afraid of heights.*

CHOOSE A STRATEGY
- Can you use "if...then" statements to help match the people with the circus jobs? *Yes*
- The symbol at the top of your sheet means to use logical thinking to help solve the problem. What other strategy could you use with logical thinking? *We can make a table with the names and the jobs.*

SOLVE IT
- If you make a table, how many columns do you need? *4* how many rows? *4*
- What do you want to keep track of in the columns? *The names* in the rows? *The jobs in the circus*
- Begin with Gigi. What is she doing? *Training her dog to be a seeing-eye dog* If she is training her dog, then which job in the circus do you think would be like this? *She would be the animal trainer.*
- If you can put a Y in one of the boxes for Gigi, then can you put a N in some of the other boxes? *Yes* Which boxes can you put an N in? *All the other jobs for Gigi, and then in the other boxes for animal trainer*
- What does Evan always do? *He always tells jokes* Does this give you a clue to what job he might like in the circus? *Yes, he would be the clown.*
- What do you know about Amelia? *She is afraid of heights.* Does this give you a clue about a job that she would *not* have in the circus? *Yes, she would not be a trapeze artist.* How many jobs are left? *1* Then what job do you think you could match with Amelia? *The juggler*
- Which job is left now? *The trapeze artist* Is there someone left to match the job with? *Yes, Collin*

Solution: Gigi - animal trainer, Evan - clown, Amelia - juggler, Collin - trapeze artist

	Gigi	Evan	Amelia	Collin
animal trainer	Y	N	N	N
juggler	N	N	Y	N
clown	N	Y	N	N
trapeze artist	N	N	N	Y

LOOK BACK
- Read the problem again. Look at the information given and the main question. Review your work. Is your answer reasonable?

40   Trina, Avi, Luis, and Roxanne are trying to decide whether to go see "Trolls From Outer Space," "The Lost Pelican," "The Yellow Ghost," or "Singing In The Snow." Luis loves to read books on science fiction. Trina likes singing and dancing in the school plays, and Roxanne hates scary programs on television. Which movie do you think each one of them would choose?

FIND OUT • What is the question you have to answer?
  • Who is going to the movies?
  • What movies are they thinking about going to?
  • What do you know about Luis? Trina? Roxanne?

CHOOSE A STRATEGY • Circle to show what you choose.

SOLVE IT • If you make a table, how many columns do you need? how many rows?
  • What do you want to put at the top of the columns? by the rows?
  • Begin with Luis. What does he like? Then can you find a movie you think he would choose?
  • If you find a movie for Luis, put a Y in the box. Then what boxes can you put an N in?
  • What does Trina like to do? Which movie do you think she would choose?
  • What do you know about Roxanne? Can you find a movie you think she would *not* like? How many movies are left? Can you match a movie with Roxanne?
  • How many movies are left? Which person is left? Can you match everyone up?

	Luis	Trina	Avi	Roxanne
"Trolls From Outer Space"	Y	N	N	N
"Singing in the Snow"	N			
"The Yellow Ghost"	N			
"The Lost Pelican"	N			

LOOK BACK • Read the problem again. Look at the information given and the main question. Review your work. Is your answer reasonable?

40 Trina, Avi, Luis, and Roxanne are trying to decide whether to go see "Trolls From Outer Space," "The Lost Pelican," "The Yellow Ghost," or "Singing In The Snow." Luis loves to read books on science fiction. Trina likes singing and dancing in the school plays, and Roxanne hates scary programs on television. Which movie do you think each one of them would choose?

FIND OUT
- What is the question you have to answer? *Which movie do you think each one of them would choose?*
- Who is going to the movies? *Trina, Avi, Luis, and Roxanne*
- What movies are they thinking about going to? *"Trolls From Outer Space," "The Lost Pelican," "The Yellow Ghost," "Singing In The Snow"*
- What do you know about Luis? *He likes science fiction.* Trina? *She likes singing and dancing.* Roxanne? *She hates scary programs on television.*

CHOOSE A STRATEGY
- Can you use "if...then" statements to figure out which each person would choose? *Yes*
- The symbol at the top of your sheet means to use logical reasoning to help solve the problem. What other strategy could you use with the logical reasoning? *We can make a table with the names of the kids and the names of the movies.*

SOLVE IT
- If you make a table, how many columns do you need? *4* how many rows? *4*
- What do you want to put at the top of the columns? *The names of the kids* by the rows? *The names of the movies*
- Begin with Luis. What does he like? *Science fiction* Then can you find a movie you think he would choose? *Yes, probably "The Trolls From Outer Space"*
- If you find a movie for Luis, put a Y in the box. Then what boxes can you put an N in? *By the other movies for Luis, and by the other kids for "Trolls From Outer Space"*
- What does Trina like to do? *Sing and dance in school plays* Which movie do you think she would choose? *"Singing In The Snow"*
- What do you know about Roxanne? *She hates scary programs on television.* Can you find a movie you think she would *not* like? *"The Yellow Ghost"* How many movies are left? *1* Can you match a movie with Roxanne? *Yes, "The Lost Pelican"*
- How many movies are left? *1* Which person is left? *Avi* Can you match everyone up? *Yes*

Solution: Luis - "Trolls from Outer Space," Trina - "Singing in the Snow,"
Avi - "The Yellow Ghost," Roxanne - "The Lost Pelican"

	Luis	Trina	Avi	Roxanne
"Trolls From Outer Space"	Y	N	N	N
"Singing in the Snow"	N	Y	N	N
"The Yellow Ghost"	N	N	Y	N
"The Lost Pelican"	N	N	N	Y

LOOK BACK
- Read the problem again. Look at the information given and the main question. Review your work. Is your answer reasonable?

PRACTICE
- Similar Practice Problems: 68, 106, 119

41 The gremlins' garden has special tomato plants and pumpkin vines. Every tomato plant has 5 tomatoes on it and every pumpkin vine has 4 pumpkins on it. If the gremlins have a total of 253 tomatoes and pumpkins in their garden, how many tomato plants and how many pumpkin vines do they have?

FIND OUT
- What is the question you have to answer?
- What do the gremlins have in their garden?
- How many tomatoes are on each tomato plant?
- How many pumpkins are on each pumpkin vine?
- What is the total number of tomatoes and pumpkins in the gremlins' garden?

CHOOSE A STRATEGY
- Circle to show what you choose.

SOLVE IT
- What is the total number of tomatoes and pumpkins?
- If you make a guess for the tomatoes, it will be a multiple of what number? What is your guess?
- If you make a guess for the pumpkins, it will be a multiple of what number? What is your guess?
- What is the total of your two numbers?
- Check your guess. If your guess is wrong, what do you need to do for your next guess?
- Keep guessing until you find the right total. How many tomato plants and how many pumpkin vines do the gremlins have?

LOOK BACK
- Read the problem again. Look at the information given and the main question. Review your work. Is your answer reasonable?

41 The gremlins' garden has special tomato plants and pumpkin vines. Every tomato plant has 5 tomatoes on it and every pumpkin vine has 4 pumpkins on it. If the gremlins have a total of 253 tomatoes and pumpkins in their garden, how many tomato plants and how many pumpkin vines do they have?

FIND OUT
- What is the question you have to answer? *How many tomato plants and pumpkin vines do they have?*
- What do the gremlins have in their garden? *Tomato plants and pumpkin vines*
- How many tomatoes are on each tomato plant? *5*
- How many pumpkins are on each pumpkin vine? *4*
- What is the total number of tomatoes and pumpkins in the gremlins' garden? *253*

CHOOSE A STRATEGY
- Would it help to make a guess for this problem? *Yes*
- The symbol at the top of your sheet means to guess and check to help solve this problem.

SOLVE IT
- (This is one example of answers for one guess. There will be many different guesses for this problem.)
- What is the total number of tomatoes and pumpkins? *253*
- If you make a guess for the tomatoes, it will be a multiple of what number? *5* What is your guess? *125*
- If you make a guess for the pumpkins, it will be a multiple of what number? *4* What is your guess? *160*
- What is the total of your two numbers? *185*
- Check your guess. If your guess is wrong, what do you need to do for your next guess? *Make the guesses larger*
- Keep guessing until you find the right total. How many tomato plants and how many pumpkin vines do the gremlins have? *45 tomato plants, 7 pumpkin vines*

Solution: 45 tomato plants, 7 pumpkin vines

LOOK BACK
- Read the problem again. Look at the information given and the main question. Review your work. Is your answer reasonable?

EXTEND IT
- If the gremlins have 505 tomatoes and pumpkins in their garden, how many tomato plants and how many pumpkin vines do they have?

42 In the huge fish tank there are silver fish and blue fish. There are 405 fish altogether, and there are 125 more silver fish than blue fish. How many fish of each kind are there?

FIND OUT • What is the question you have to answer?
  • What are the two kinds of fish in the tank?
  • How many fish are there altogether?
  • How many more silver fish than blue fish are there?

CHOOSE A STRATEGY • Circle to show what you choose.

SOLVE IT • What is the total number of fish in the tank? How many more silver fish than blue fish are there?
  • Begin with the blue fish and make a guess. What is your guess?
  • If you make a guess for the silver fish, will it be more or less than the guess for the blue fish? What is your guess?
  • What is your total of your two numbers?
  • Check your guess. How did you do?
  • If your guess was wrong, how can you make your next guess better?

LOOK BACK • Read the problem again. Look at the information given and the main question. Review your work. Is your answer reasonable?

42 In the huge fish tank there are silver fish and blue fish. There are 405 fish altogether, and there are 125 more silver fish than blue fish. How many fish of each kind are there?

FIND OUT
- What is the question you have to answer? *How many fish of each kind are there?*
- What are the two kinds of fish in the tank? *Silver and blue*
- How many fish are there altogether? *405*
- How many more silver fish than blue fish are there? *125 more silver than blue*

CHOOSE A STRATEGY
- Would it help to make a guess for this problem? *Yes*
- The symbol at the top of your sheet means to use guess and check to help solve the problem.

SOLVE IT
- (This is an example of one set of guesses. The students will have many different guesses for this problem.)
- What is the total number of fish in the tank? *405* How many more silver fish than blue fish are there? *125*
- Begin with the blue fish and make a guess. What is your guess? *150*
- If you make a guess for the silver fish, will it be more or less than the guess for the blue fish? *More* What is your guess? *275*
- What is your total of your two numbers? *425*
- Check your guess. How did you do? *The guess is too large.*
- If your guess was wrong, how can you make your next guess better? *We need to make our guesses smaller.*

  Solution: 265 silver, 140 blue

LOOK BACK
- Read the problem again. Look at the information given and the main question. Review your work. Is your answer reasonable?

EXTEND IT
- If there are a total of 791 fish, and 125 more blue fish than silver fish, how many blue fish and how many silver fish are there?

PRACTICE
- Similar Practice Problems: 90, 103, 117

43 Slowly Katie peeked around the door. The huge monster wiped its mouth, smiled, went to sleep, and started to snore. Katie had been watching while the monster ate the cakes in the bakery. The first hour it ate $\frac{1}{2}$ of all the cakes in the bakery; the second hour it ate $\frac{1}{2}$ of all the cakes left; the third hour it ate $\frac{1}{2}$ of what was left; and the fourth hour it ate $\frac{1}{2}$ the cakes left again. Now there are 3 cakes left. How many cakes did the monster eat?

FIND OUT
- What is the question you have to answer?
- What is Katie doing?
- What did the monster do the first hour? the second hour? the third hour? the fourth hour?
- How many cakes are left after the fourth hour?
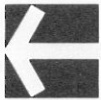
CHOOSE A STRATEGY
- Circle to show what you choose.

SOLVE IT
- What is the one number of cakes you are given? Where does this information come in the problem?
- Working backwards from the number of cakes left, you come to the fourth hour. What do you know about the number of cakes he ate in the fourth hour? If you know how many are left after this, then how many did he eat?
- Work backwards again to the third hour. What do you know about how many he ate in the third hour? Find out what was left after this by adding the amount he ate in the fourth hour with the 3 left over. How many did he eat in the third hour?
- Work backwards to the second hour. What do you know about how many he ate in this hour? Find out what was left by adding what he ate in the third and fourth hours with the 3 left over. Now what did he eat in the second hour?
- Work backwards again. How many cakes did the monster eat?

LOOK BACK
- Read the problem again. Look at the information given and the main question. Review your work. Is your answer reasonable?

43   Slowly Katie peeked around the door. The huge monster wiped its mouth, smiled, went to sleep, and started to snore. Katie had been watching while the monster ate the cakes in the bakery. The first hour it ate ½ of all the cakes in the bakery; the second hour it ate ½ of all the cakes left; the third hour it ate ½ of what was left; and the fourth hour it ate ½ the cakes left again. Now there are 3 cakes left. How many cakes did the monster eat?

FIND OUT
- What is the question you have to answer? *How many cakes did the monster eat?*
- What is Katie doing? *Watching the monster eat cakes in the bakery*
- What did the monster do the first hour? *He ate ½ of all the cakes in the bakery* the second hour? *He ate ½ of the cakes that were left* the third hour? *He ate ½ of the cakes that were left* the fourth hour? *He ate ½ of the cakes that were left*
- How many cakes are left after the fourth hour? *3*

CHOOSE A STRATEGY
- Where is the information in the problem that you need to begin with? *At the end*
- The symbol at the top of your sheet means that you can work backwards to help solve this problem.

SOLVE IT
- What is the one number of cakes you are given? *3 left when the monster goes to sleep* Where does this information come in the problem? *At the end of the problem*
- Working backwards from the number of cakes left, you come to the fourth hour. What do you know about the number of cakes he ate in the fourth hour? *He ate ½ of the cakes that were left.* If you know how many are left after this, then how many did he eat? *If 3 is ½, then he must have eaten 3.*
- Work backwards again to the third hour. What do you know about how many he ate in the third hour? *He ate ½ of the cakes that were left.* Find out what was left after this by adding the amount he ate in the fourth hour with the 3 that are left over. How many did he eat in the third hour? *6*
- Work backwards to the second hour. What do you know about how many he ate in this hour? *He ate ½ of the cakes that were left.* Find out what was left by adding what he ate in the third and fourth hours with the 3 left over. Now what did he eat in the second hour? *12*
- Work backwards again. How many cakes did the monster eat? *45*

   Solution: 45

LOOK BACK
- Read the problem again. Look at the information given and the main question. Review your work. Is your answer reasonable?

EXTEND IT
- If the monster ate ⅓ of the cakes in the first hour, then ⅓ of what was left for each of the next three hours, then how many cakes would he have eaten?

44 Six lords came to live in the city of Gimiro. The first lord built himself a tower. The second lord built a tower that was 6 feet higher than the first lord's tower. The third lord built a tower 6 feet taller than the second lord's tower. Each lord built a tower 6 feet taller than the tower built by the lord before him. The sixth lord's tower was 40 feet high. If the six towers were piled on top of each other, how high would they reach?

FIND OUT
- What is the question you have to answer?
- How many lords came to Gimiro?
- What did each lord do?
- How many feet higher was each tower than the tower built before it?

CHOOSE A STRATEGY
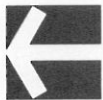- Circle to show what you choose.

SOLVE IT
- If you begin at the end of the problem and work backwards, begin with the sixth lord's tower. How high was it?
- Working backwards, what do you know about the difference between the fifth lord's tower and the sixth lord's tower? Then how high was the fifth lord's tower?
- Working backwards, what do you know about the difference between the fourth lord's tower and the fifth lord's tower? How high was the fourth lord's tower?
- Keep working backwards until you have the height of each tower. If the towers were piled on top of each other, how high would they reach?

LOOK BACK
- Read the problem again. Look at the information given and the main question. Review your work. Is your answer reasonable?

44 Six lords came to live in the city of Gimiro. The first lord built himself a tower. The second lord built a tower that was 6 feet higher than the first lord's tower. The third lord built a tower 6 feet taller than the second lord's tower. Each lord built a tower 6 feet taller than the tower built by the lord before him. The sixth lord's tower was 40 feet high. If the six towers were piled on top of each other, how high would they reach?

FIND OUT
- What is the question you have to answer? *If the six towers were piled on top of each other, how high would they reach?*
- How many lords came to Gimiro? *6*
- What did each lord do? *Built a tower*
- How many feet higher was each tower than the tower built before it? *Each one was 6 feet higher than the one before it.*

CHOOSE A STRATEGY
- Would it help to start at the end of the problem, and then work backwards? *Yes*
- The symbol at the top of your page means to work backwards to help solve the problem.

SOLVE IT
- If you begin at the end of the problem and work backwards, begin with the sixth lord's tower. How high was it? *40 feet*
- Working backwards, what do you know about the difference between the fifth lord's tower and the sixth lord's tower? *We know that the fifth lord's tower had 6 fewer feet.* Then how high was the fifth lord's tower? *It was 34 feet high.*
- Working backwards, what do you know about the difference between the fourth lord's tower and the fifth lord's tower? *The fourth lord's tower had 6 fewer feet.* How high was the fourth lord's tower? *28 feet*
- Keep working backwards until you have the height of each tower. If the towers were piled on top of each other, how high would they reach? *150 feet*

Solution: 150 feet

LOOK BACK
- Read the problem again. Look at the information given and the main question. Review your work. Is your answer reasonable?

EXTEND IT
- There were seven lords and they each built a tower 9 feet higher than the tower built before it, and the seventh lord's tower was 60 feet. If the towers were piled on top of each other, how high would they reach?

PRACTICE
- Similar Practice Problems: 67, 107, 116

45 Several soccer teams are having an end-of-the-season soccer party. The team captains are putting square tables together in a long row for the party. They can put two chairs on each side of a table. The tables are all the same size. If they put together ten tables in a row, how many people can sit down?

FIND OUT
- What is the question you have to answer?
- What are the soccer team captains doing?
- How many chairs can they put on each side of a table?
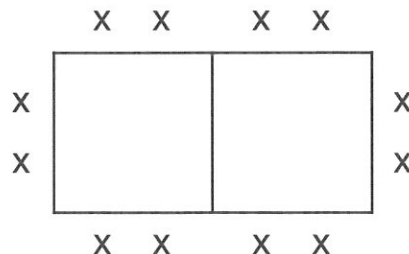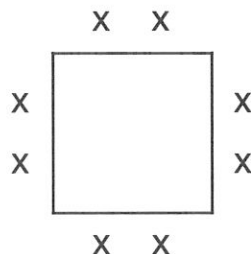- How many tables are they putting together?

CHOOSE A STRATEGY
- Circle to show what you choose.

SOLVE IT
- If you make an organized list, what do you want to keep track of?
- To make the problem simpler, begin with one table. How many people can sit at one table?
- Now put together two tables. How many people can sit at two tables?
- Put together three tables. How many people can sit down at three tables?
- Look at your organized list. Do you see a pattern?
- If they put together ten tables in a row, how many people can sit down?

```
      X  X              X  X    X  X
   +--------+        +-----------------+
 X |        | X    X |        |        | X       1 = 8
   |        |        |        |        |         2 = 12
 X |        | X    X |        |        | X
   +--------+        +-----------------+
      X  X              X  X    X  X
```

LOOK BACK
- Read the problem again. Look at the information given and the main question. Review your work. Is your answer reasonable?

45 Several soccer teams are having an end-of-the-season soccer party. The team captains are putting square tables together in a long row for the party. They can put two chairs on each side of a table. The tables are all the same size. If they put together ten tables in a row, how many people can sit down?

FIND OUT
- What is the question you have to answer? *If they put together ten tables in a row, how many people can sit down?*
- What are the soccer team captains doing? *Setting up the tables in a row*
- How many chairs can they put on each side of a table? *2*
- How many tables are they putting together? *10*

CHOOSE A STRATEGY
- Would it help to begin by seeing how many people can sit at one table? *Yes*
- The symbol at the top of your page means to make the problem simpler. What other strategy can you use? *We can make an organized list.* After you fill in some of the list, what can you look for? *We can look for a pattern.*

SOLVE IT
- If you make an organized list, what do you want to keep track of? *The number of tables and how many can sit down*
- To make the problem simpler, begin with one table. How many people can sit at one table? *8*
- Now put together two tables. How many people can sit at two tables? *12*
- Put together three tables. How many people can sit down at three tables? *16*
- Look at your list. Do you see a pattern? *Yes* What is the pattern? *If we add a table then 4 more people can sit down.*
- How many people can sit down at the party? *44*

Solution: 44

1 = 8		6 = 28	
2 = 12		7 = 32	
3 = 16		8 = 36	
4 = 20		9 = 40	
5 = 24		10 = 44	

LOOK BACK
- Read the problem again. Look at the information given and the main question. Review your work. Is your answer reasonable?

EXTEND IT
- A party is planned at Vincent's Restaurant. They are setting up the tables, which are square, and can seat three people on a side. If they put together 20 tables in two rows, how many people can sit down?

46 Priscilla Pig loves pink. Everything she has is pink. She just built a brick wall and she is going to paint it pink. The wall has 14 bricks across and is 11 bricks high. She is going to paint each side of the bricks that are facing out. How many sides will Priscilla have to paint?

FIND OUT
- What is the question you have to answer?
- What is Priscilla doing with her wall?
- How wide is the wall?
- How high is the wall?
- Are there any conditions for painting the wall?

**CHOOSE A STRATEGY**
- Circle to show what you choose.

SOLVE IT
- If you make an organized list, what do you want to keep track of?
- Begin with one brick. How many sides would she need to paint?
- Put together 2 bricks. How many sides would she need to paint?
- Keep adding to your list. Do you see a pattern?
- Figure out the number of sides for a row of 14 bricks. How many sides would need to be painted?
- Now add another row on top of the 14 bricks. How many sides would need to be painted now?
- Add another row on top of that. Do you see a pattern in the increasing number of sides?
- How many sides will Priscilla have to paint?
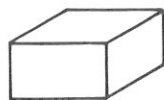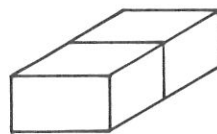
1 = 5   2 = 8

LOOK BACK
- Read the problem again. Look at the information given and the main question. Review your work. Is your answer reasonable?

A
B
C

46 Priscilla Pig loves pink. Everything she has is pink. She just built a brick wall and she is going to paint it pink. The wall has 14 bricks across and is 11 bricks high. She is going to paint each side of the bricks that are facing out. How many sides will Priscilla have to paint?

FIND OUT
- What is the question you have to answer? *How many sides will Priscilla have to paint?*
- What is Priscilla doing with her wall? *She is painting it pink.*
- How wide is the wall? *14 bricks*
- How high is the wall? *11 bricks*
- Are there any conditions for painting the wall? *She is painting every side that is facing out.*

CHOOSE A STRATEGY
- Would it help to begin by seeing how many sides would be painted for 1 brick? *Yes*
- The symbol at the top of your sheet means to make the problem simpler. What other strategy can you use with this? *We can make an organized list.* What can you look for in the list? *A pattern*

SOLVE IT
- If you make an organized list, what do you want to keep track of? *The number of bricks and the number of sides to be painted*
- Begin with one brick. How many sides would she need to paint? *5*
- Put together 2 bricks. How many sides would she need to paint? *8*
- Keep adding to your list. Do you see a pattern? *The number keeps increasing by 3.*
- Figure out the number of sides for a row of 14 bricks. How many sides would need to be painted? *44*
- Now add another row on top of the 14 bricks. How many sides would need to be painted now? *74*
- Add another row on top of that. Do you see a pattern in the increasing number of sides? *Yes, it keeps increasing by 30.*
- How many sides will Priscilla have to paint? *344*

Solution: 344

1	=	5	8	=	26
2	=	8	9	=	29
3	=	11	10	=	32
4	=	14	11	=	35
5	=	17	12	=	38
6	=	20	13	=	41
7	=	23	14	=	44

LOOK BACK
- Read the problem again. Look at the information given and the main question. Review your work. Is your answer reasonable?

EXTEND IT
- If Priscilla had a wall 19 bricks wide and 25 bricks high, how many sides would she have to paint?

PRACTICE
- Similar Practice Problems: 71, 104, 115

47   Which is better, a new $5 bill or an old one?

FIND OUT   • What is the question you have to answer?
               • What are the two bills in the problem?

CHOOSE A   • Circle to show what you choose.
STRATEGY

SOLVE IT   • Do you think this is a hard question, or easy to answer?
               • If you think it is very easy, do you think there may be a trick to
                 the question?
               • Try to think of all the different meanings the words could have.
                 What are some of the things you can think of?
               • Is there more than one meaning for the words "an old one?"
               • Which is better, a new $5 bill or an old one?

LOOK BACK • Read the problem again. Look at the information given and the
                 main question. Review your work. Is your answer reasonable?

47   Which is better, a new $5 bill or an old one?

FIND OUT
- What is the question you have to answer? *Which is better, a new $5 bill or an old one?*
- What are the two bills in the problem? *A new $5 bill and an old one*

CHOOSE A STRATEGY
- Do you run into problems sometimes where your methods for problem solving don't seem to work? *Yes*
- The symbol at the top of your sheet means to brainstorm. Try to open up your mind to new and different ways of thinking about problems. Be flexible and try everything.

SOLVE IT
- (This is an example of the type of student responses you might get. Encourage a wide variety of opinions and ideas, that's the whole idea of brainstorming!)
- Do you think this is a hard question, or easy to answer? *Easy*
- If you think it is very easy, do you think there may be a trick to the question? *Maybe there is a trick.*
- Try to think of all the different meanings the words could have. What are some of the things you can think of? *We can think of what better means, or maybe whether new things are really better than old things.*
- Is there more than one meaning for the words "an old one?" *Yes, because "old one" could mean old $5 bill or maybe an old $1 bill.*
- Which is better, a new $5 bill or an old one? *A $5 bill is always better than $1.*

  Solution: $5 is always better than $1

LOOK BACK
- Read the problem again. Look at the information given and the main question. Review your work. Is your answer reasonable?

48 A rope ladder with eight rungs 9 inches apart is hanging over the side of a ship. The last rung is just touching the water. If the tide rises one foot an hour, how long will it take for the first four rungs to be covered with water?

FIND OUT
- What is the question you have to answer?
- What is hanging over the side of the ship?
- How many rungs are on the ladder?
- How far apart are the rungs?
- How fast is the tide rising?

CHOOSE A STRATEGY
- Circle to show what you choose.

SOLVE IT
- If the tide is rising by 1 foot an hour, how long will it take to cover one rung?
- What happens to the boat when the tide comes in?
- What will happen to the ladder on the boat when the tide comes in?
- Is there another way to think about this problem that has nothing to do with all the information you are given?
- How long will it take for the first four rungs to be covered with water?

LOOK BACK
- Read the problem again. Look at the information given and the main question. Review your work. Is your answer reasonable?

48

A rope ladder with eight rungs 9 inches apart is hanging over the side of a ship. The last rung is just touching the water. If the tide rises one foot an hour, how long will it take for the first four rungs to be covered with water?

FIND OUT
- What is the question you have to answer? *How long will it take for the first four rungs to be covered with water?*
- What is hanging over the side of the ship? *A rope ladder*
- How many rungs are on the ladder? *8*
- How far apart are the rungs? *9 inches*
- How fast is the tide rising? *1 foot an hour*

CHOOSE A STRATEGY
- Do you need to think about problems in a new and different way sometimes? *Yes*
- The symbol at the top of your sheet means to brainstorm. Open up your mind, be flexible, and try all kinds of new ideas.

SOLVE IT
- (This is just an example of possible student responses. Encourage a variety of ideas, help the students to brainstorm.)
- If the tide is rising by 1 foot an hour, how long do you think it will take to cover one rung? *The first rung is at the water line, so it will be covered right away.*
- What happens to the boat when the tide comes in? *It floats, so it goes up with the water*
- What will happen to the ladder on the boat when the tide comes in? *It will go with the boat.*
- Is there another way to think about this problem that has nothing to do with all the information you are given? *Yes*
- How long will it take for the first four rungs to be covered with water? *They will never be covered, because the ladder rises with the boat.*

Solution: Never, because the ladder rises with the boat.

LOOK BACK
- Read the problem again. Look at the information given and the main question. Review your work. Is your answer reasonable?

PRACTICE
- Similar Practice Problems: 108, 114, 120

49 Saburo is going to the beach. He is looking for a towel, a T-shirt, and something to play with. He finds three T-shirts: red, green, and blue. He finds three towels: striped, plaid, and dotted. He finds three things he can play with at the beach: a frisbee, a kite, and a ball. He picks out one towel, one T-shirt, and one thing to play with. What are all the different combinations of things he could choose?

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50 Carlota has met five new friends at school that live near her: Stefano, Taro, Marianne, Laura, and John. She is trying to figure out where each of them lives. Stefano and Taro both have fenced yards. Marianne does not have a chimney on her house. There is a big dog in Taro's yard and John lives in a four-floor apartment house. Can you put a name with each house or apartment?
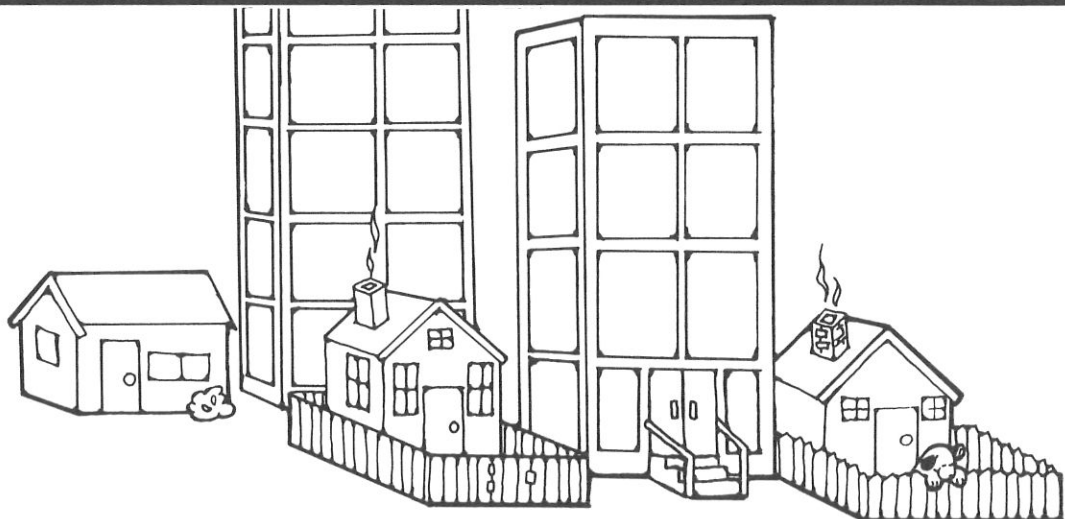
51 Conrad was scared as he knocked on the door. A low voice said; "Before I open the door you must name the secret number." Here are some clues:

- It is greater than 275.
- It is less than 325.
- If you count by 5s you say its name.
- It can be divided evenly by 3 and 9.

What is the secret number?

- -

52 Troy was feeding the animals at the zoo. He started at the monkey's cage. Then he walked down the hill 3 cages to feed the birds. The birds are in the first cage in the zoo. Then Troy went up the hill 7 cages to feed the seals. From there he went down the hill 5 cages to feed the bears. Next he went up the hill 8 cages to the elephants. They are in the last cage in the zoo. How many cages are there in the zoo?
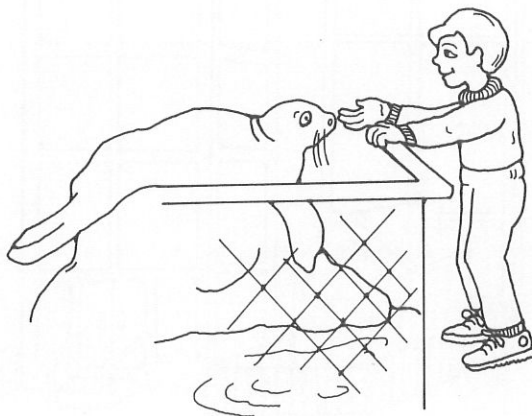
53 Yolanda and Masami are playing a game with a timer and three dice. Each player rolls three dice and uses the three numerals rolled to make 3-digit numbers. A numeral can only be used once in a number. Each number is worth 10 points. Masami rolls 3, 6, and 5. How many points can he earn?

54 It took Georgio and Amelio a total of 2 hours to put up all the notices for the pet show. They posted notices on trees and bulletin boards around town. All kinds of prizes were to be given, including one for the "ugliest" pet. Amelio worked three times as long as Georgio putting up signs. How long did each of them work?

55 Erin was on Pine Lane, trying to remember where each of her six new friends lived: Sean, Jiro, Lee, Elsa, Dina, and Cam. She knew they lived across from each other in the first three houses on each side of the street. She remembered that Sean lived in the first house directly across the street from Jiro and next door to Lee. She also remembered that Elsa lived next door to Jiro and on the same side of the street as Cam. Where did each friend live?

- -

56 Nora and Ned were lost in the bushes. The two dogs had been chasing a cat in the park. A friendly bluejay offered to guide them out of the bushes. He told them to go ahead 5 bushes and turn right; then go ahead 6 bushes and turn left; then go ahead 5 bushes and turn left; then go ahead 6 bushes, and turn right. Then if they would go straight ahead, they would be out of the bush maze. Can you make a map to show the path that the bluejay told Nora and Ned to follow?
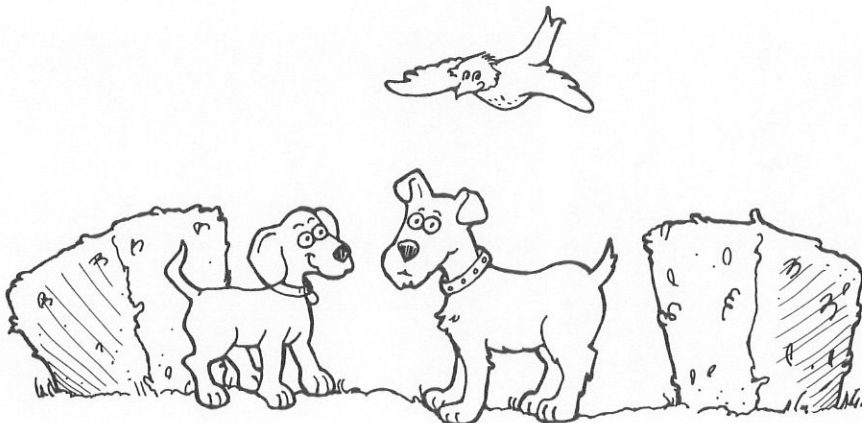
57 Holly needed 45 cents worth of stamps to send a letter to her pen pal. She looked at the stamps her mother had, and they were all 15-cent, 10-cent, and 5-cent stamps. How many different combinations of stamps could Holly put on her letter?

58 There were two baby dolphins at the South City Aquarium. Baby Dave is 25 days old and baby Dan is 5 days old. When will Dave be three times as old as Dan?
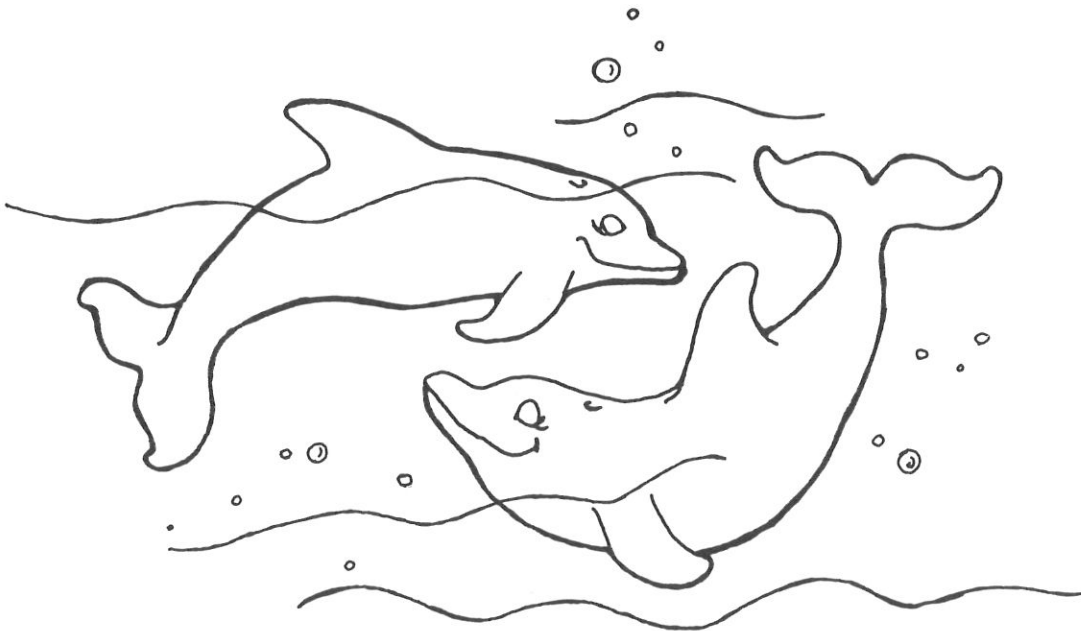
59 Sabrina's great-grandfather was 100! They were celebrating with a big family cookout and Sabrina was taking orders. She found one fifth as many people wanted chicken as wanted ribs, one fourth as many people wanted ribs as wanted hot dogs, and one half as many people wanted hot dogs as wanted hamburgers. Sabrina gave her brother, the chef, an order for 80 hamburgers. How many people asked for chicken, how many people asked for ribs, and how many asked for hot dogs?

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60 Tisha and Joy went to a farm where you could pick your own strawberries. In the first 10 minutes together they picked 21 strawberries. In the second 10 minutes they picked 11 more strawberries than they did in the first 10 minutes, or 32 strawberries. In the third 10 minutes they picked 11 more strawberries than they picked in the second 10 minutes, or a total of 43. Each 10 minutes they picked 11 more strawberries than they had picked during the previous 10 minutes. How long would it take them to pick over 250 strawberries?
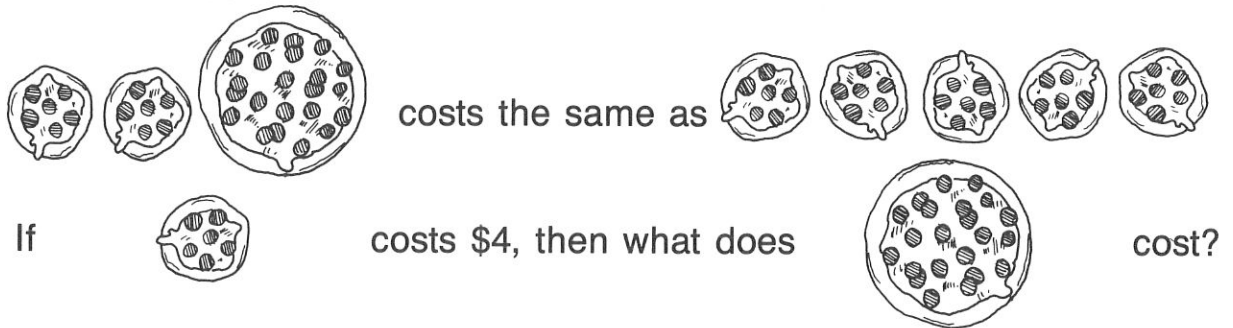
61 Tod and Pat set up the display case of toys for sale. The display case had 5 columns and 5 rows. They put 5 cars, 5 planes, 5 trains, 5 trucks, and 5 boats in the case. The store manager told them to be sure to have 5 different things in each column and each row. How did they set up the display?

62 At Pizza Madness:


costs the same as

If costs $4, then what does cost?
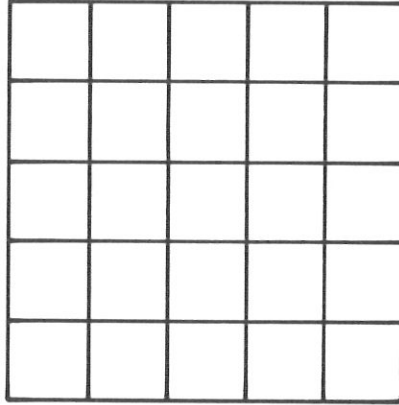
63 Lee is keeping track of how many people request the two most popular books in the library. During the first week there were 5 requests for both *Freaky Frisbees From Outer Space* and *Harlow, the Talking Goat*. During the second week there were 7 requests for the frisbee book and 9 for the goat book. During the third week there were 9 requests for the frisbee book and 8 requests for the goat book. During the fourth week there were 11 requests for the frisbee book and 12 requests for the goat book and during the fifth week there were 13 requests for the frisbee book and 11 requests for the goat book. If this rate continued, how many people would ask for the goat book when 25 people were asking for the frisbee book?

64 The Bookworm had 20 copies of *Raising Your Rabbit Right!*. After a week they had 17 copies left. At the end of two weeks they had 16 copies left and after three weeks they had 13 copies left. At the end of four weeks they had 12 copies left. If they kept selling copies of the book at this same rate, how many copies would they have left at the end of nine weeks?

65 Kimiko's mother and father own a toy store. Today Kimiko and her mother are buying some tiny clay animals for the store. Her mother likes the seals that are 22 cents each. Kimiko likes the bears that are 29 cents each. Her mother gets some of both and pays $5.39. How many of each kind of animal did Kimiko's mother buy?

66 Tanya and Janelle were going to a musical show at the county fair. First they could go through 8 different gates to get into the fair. Once inside there were 6 ticket booths. Past the ticket booths were 4 different paths to the musical show. How many different ways could Tanya and Janelle get from outside the fair to the musical show?
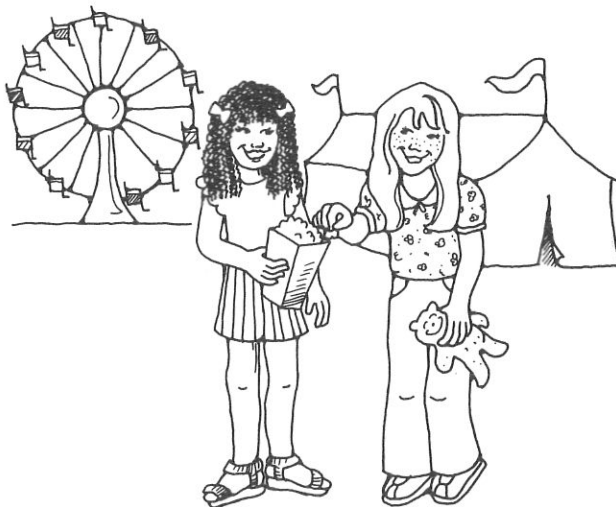
67 The seagulls were following the Sea Wolf because Ted and Mike had a good catch that morning. They caught 40 fish during the fourth hour, and one half that many during the third hour. Ted and Mike pulled in one half as many fish furing the second hour as during the third hour. During the first hour, they caught one half as many as in the second hour. How many fish did Ted and Mike catch all together in the four hours?
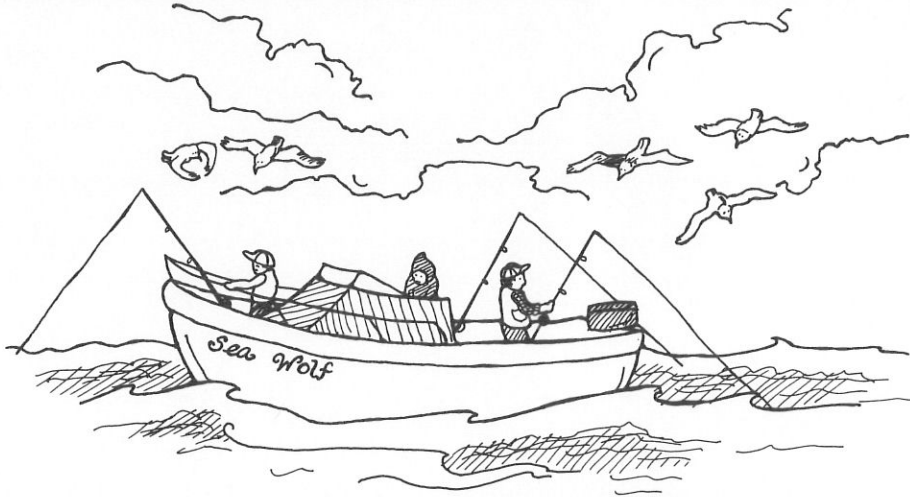
68 Iris, Maxine, Rudolfo, and Ralph were dreaming about competing in the Olympics in track, swimming, the high jump, and gymnastics. Iris is the fastest runner at school, and Ralph hates water. When Rudolfo goes to school, he jumps over the gate instead of going through it. Which Olympic sport do you think each of the kids would choose?

**69** Can you fill in the rest of the squares?

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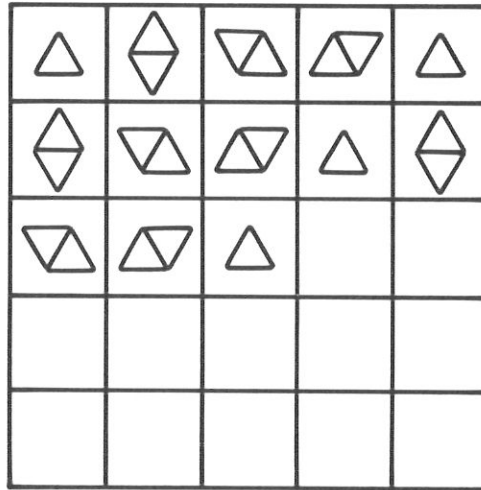
70 Stuart's dog Barney wagged his tail. Barney had never seen so many dogs at once. Stuart counted up all the dogs at the dog show.

- The number is greater than 195.
- The number is less than 300.
- If you count by 10s you say its name.
- It can be divided evenly by 3 and 9.

How many dogs did Stuart count?

71 Sasha's family is having a big reunion on July 4. They borrowed tables and are setting them up outside. They can put three chairs on each side of the tables. If they set up 8 tables in a long row, with the tables together on one side, how many family members can sit down to eat?

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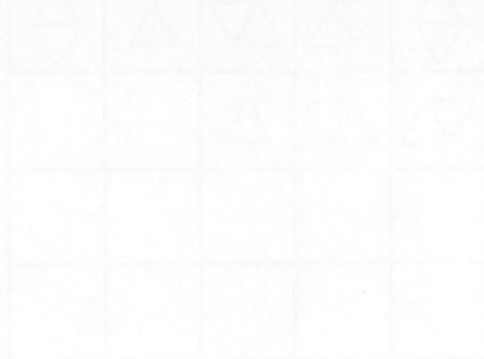
72 At school they did a survey of everyone's favorite sport. The survey showed that one third as many kids liked tennis as liked basketball. There were one fifth as many kids who said they liked basketball as said they liked baseball or softball. Then one half as many kids liked baseball or softball as liked soccer. There were 90 kids who liked soccer the best. How many kids did they interview, and how many liked each sport the best?

73   Wilma, a wicked witch, decided to steal 300 ladybugs for her garden. On the first day she took 20 ladybugs. On the second day she took 15 more ladybugs than on the first day. Each day she took 15 more ladybugs than she had taken the day before. How many days did it take Wilma the wicked witch to steal more than 300 ladybugs?

74   Angie and Lisa were taking gymnastics together. One day each of them ran to class from where they lived. Together it took them $12\frac{3}{4}$ minutes. It took Lisa twice as much time as it took Angie. How many minutes did it take each of them to run to class?

75 Rod and Lucas were painting scenery for the school play. They had to decide what color to paint the house, the car, and some flowers. For the house they could choose between blue and green. For the car they could pick silver, black, or brown. For the flowers they could choose red, pink, or yellow. How many different combinations of colors could they choose?
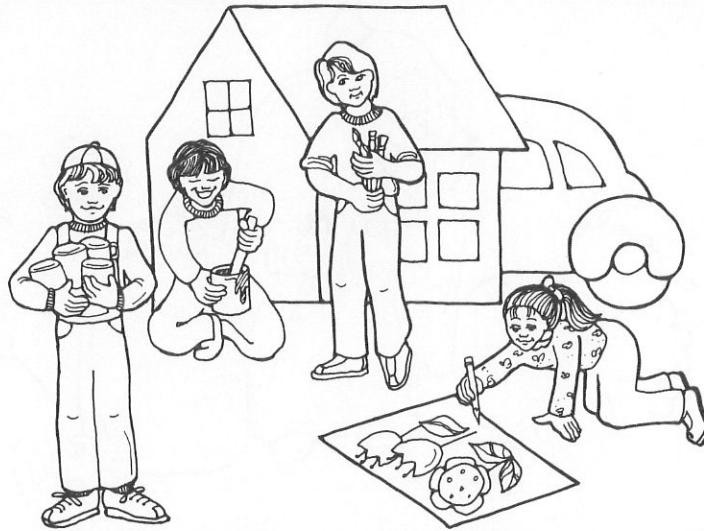
76 Clayton is getting some friends together to go to a movie. He is getting his friends who live on his floor of the apartment building. First he walks down the hall 6 apartments to get Martha. Martha lives in the last apartment on the floor. Then Clayton goes up the hall 10 apartments to get William. Next he goes down the hall 3 apartments to find Rita. From here he goes up the hall 6 apartments to pick up James. He lives in the last apartment on the floor. If there are the same number of apartments on both sides of the hall, how many apartments are there altogether on Clayton's floor?

77 Dylan, Sergio, Emilio, Darren, Brent, and Tony are in line for the Saturday matinee. Dylan and Emilio have on hats. Emilio and Tony have backpacks. Sergio is the tallest and Darren is not wearing glasses. Can you put a name with each of the boys in line?

78 Libby and Kaz were setting out records and tapes, jewelry, toys, books, posters, and T-shirts for the White Elephant Sale at school. They were setting up six tables in two rows. They put the records and tapes across from T-shirts and next to the books. They put the posters at the opposite end of the row from the T-shirts. The toys were not put next to the T-shirts. How did Libby and Kaz set up the tables for the White Elephant Sale?

79   Joe is typing up a list of 2-digit numbers, but he has a problem. He is using a very old typewriter and a lot of the keys are stuck. The only numerals that will type are 1, 4, 6, and 8. How many different 2-digit numbers could he make with these numerals?

- -

80   Toshio and Sumi have new bikes and already Toshio has ridden 8 miles. Sumi has ridden 1 mile. If each one rides 1 mile a day, how many days will it be before Toshio has ridden twice as far as Sumi?
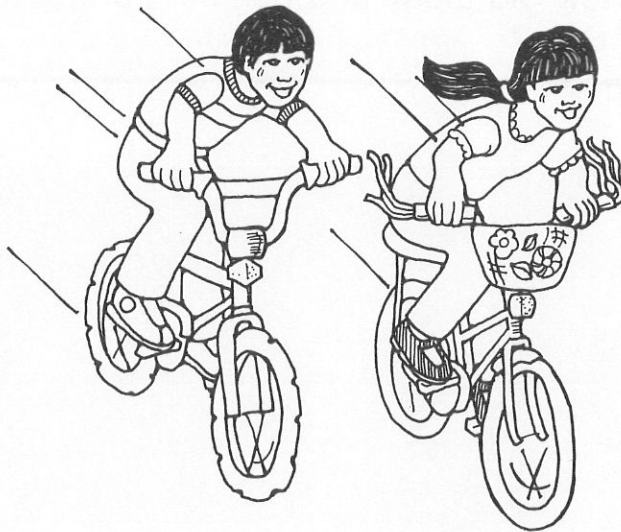
81 At the skateboard park near Ivan, there seemed to be more skateboarders each week. Ivan counted 20 skateboarders one week. The next week there were 27, and the next week there were 31. There were 38 skateboarders the fourth week and 42 the fifth week. In what week would Ivan count 80 or more skateboarders?

**82** Lia and Carlos went on a bike ride with Anita. They left Anita's house and went 3 blocks to Maple Street and turned right. They went straight ahead 6 blocks to Pine and turned left. They went 4 blocks to Elm and turned left. Then they went straight ahead 4 blocks when Anita stopped, and said she wanted to go back to her house. What was the shortest way back to Anita's house?

83 Midori, Anna, Sonia, Rita, and Paula were at summer camp. One day they decided to exchange T-shirts for the next 5 days. Together they had a brown, a white, a yellow, a pink, and a red T-shirt. They decided that no girl could wear a T-shirt more than one day, so they would have to exchange shirts each day. How could they arrange the shirts for the next 5 days?

84 Doug was daydreaming about his fishing trip when the busdriver said, "Put 32 cents in the meter please!" Doug reached in his pocket, found the right coins and put them in the meter. What are all the different combinations of coins that Doug could have put in the meter?
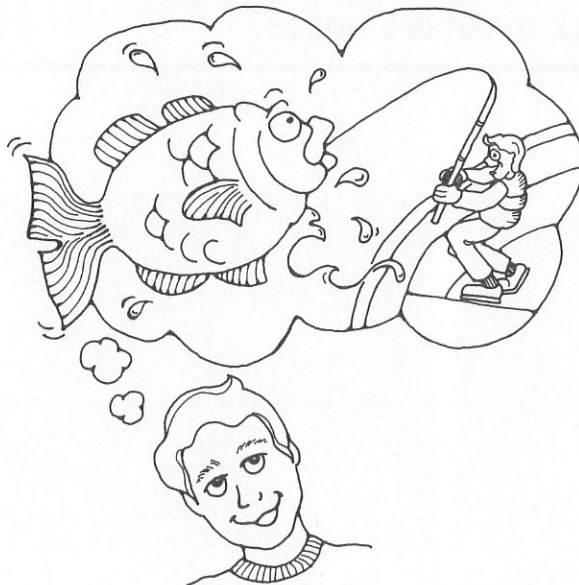
85 Morris hated raking leaves. There were two trees that he hated the most, because they always were dropping leaves. One day he decided to count how many red and yellow leaves dropped from the trees every hour. In the first hour there were 8 red leaves and 8 yellow leaves on the ground. In the second hour there were 12 yellow leaves and 15 red leaves on the ground. In the third hour he counted 15 yellow leaves and 16 red leaves on the ground. In the fourth hour there were 19 yellow leaves and 23 red leaves on the ground. Then at the end of the fifth hour he found 22 yellow leaves and 24 red leaves on the ground. If the leaves kept dropping at the same rate, how many hours would it take for 50 red leaves and 50 yellow leaves to drop on the ground?

86 While the Foonies were flying through space, in one hour they saw one third as many strange objects as moons. They saw 4 fewer moons than UFOs. They saw one fourth as many UFOs go by as stars. They saw 88 stars out the window of their spacecraft. How many things did they see altogether in that hour?
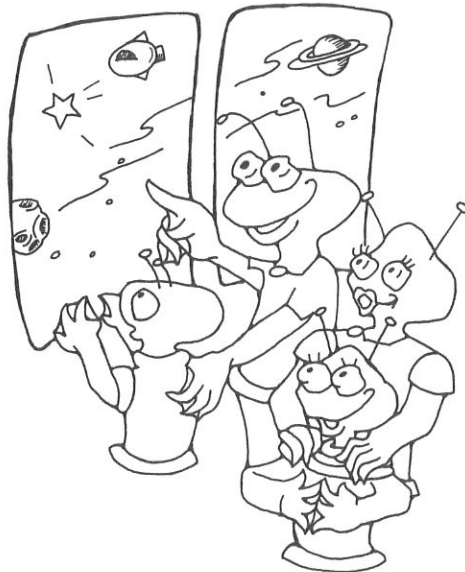
87 Ross is packing two sizes of boxes at the Tasty Tuna Company.

| A | | A | | A | | B | holds the same number of cans as | A | | A | | A |
| A | | A | | A |
| A |

If | A | holds 34 cans, then what does | B | hold?

88 Russell and Gwen signed up to bike and run in the Holly School Move-a-thon. People signed up to give money for every mile they biked or ran. They got 15 cents for every mile they biked and 25 cents for every mile that they ran. Russell biked and Gwen ran. Together they raised $3.05. How many miles did Russell bike and how many miles did Gwen run?

89 Danielle was the 100th runner across the finish line. Lots of runners finished after Danielle. Here are some clues for the number of runners who finished the race:

- It is more than 280.
- It is less than 316
- If you count by 4s you say its name.
- It can be divided evenly by 7.

How many runners crossed the finish line?

90 Antonio was saving pennies and nickels. He had a total of 95 coins worth $2.75. How many pennies and how many nickels did he have?

91 The famous Professor Leaf is showing off his rare plants. He gives each plant a letter name because the real names are hard to spell and pronounce.

- A and C have jagged leaves.
- A and D have thick stems.
- B and E have flowers.
- E has flowers that look like trumpets.
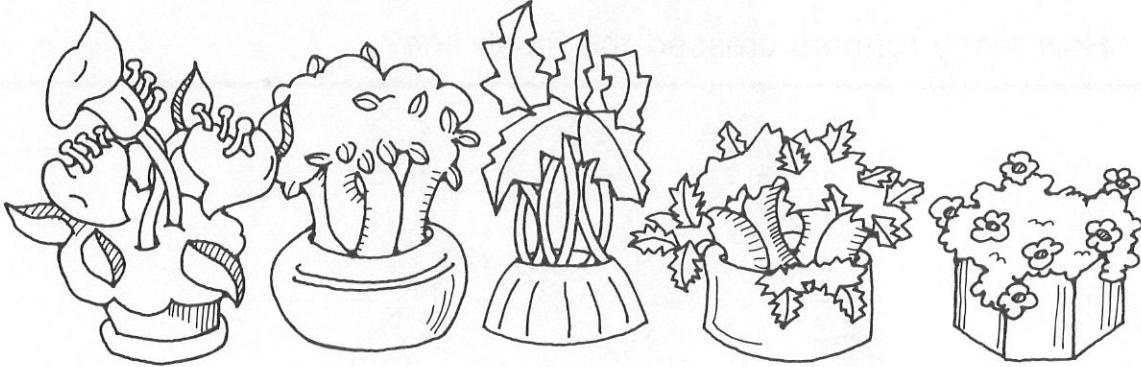
Can you put a letter by each of Professor Leaf's plants?

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92 Teresa built a 2-story apartment house for her hamsters: Gerald, Farley, Sam, Meredith, Lana, and Lara. She put each hamster in one of the 6 apartments. She put Gerald next to Lara and above Farley. Lana was at the other end from Lara. Sam was not directly below Lana. Where did Teresa put each of the hamsters?

93 On Saturday Megan liked to go to Sandwich Heaven. Megan could choose the bread, filling, and topping for her sandwich. She could choose between wheat, rye, or white bread. She could have chicken salad, turkey, or ham for the filling. She could also have lettuce, tomato, or sprouts on top. How many different sandwiches could Megan order?

94 Carla delivers packages in a secret underground building. Today she started on the first floor and went up 7 floors. Then she went down 3 floors, and then up 16 floors. She went up 2 more floors to the top floor of the building. How many floors were in this secret underground building?
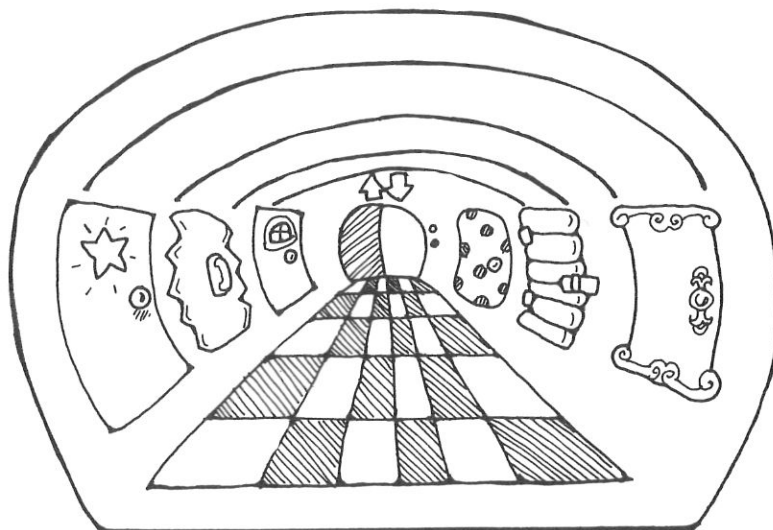
95 Ben was a wonderful ball-finder. Every time Gina and Holly took him to the park he ran into the bushes and came out with a tennis ball. They had a big collection of balls, 180 altogether. Ben liked yellow tennis balls the best, so he brought them four times as many yellow ones as all the other colors together. How many yellow balls did they have, and how many were not yellow?

96 Barbara and Janet were collecting Terrible Willy stickers. Barbara had 8 stickers and Janet had 4. Barbara collected a new one each week and Janet collected 2 new ones each week. How many weeks would it take for Janet to have exactly 10 more stickers than Barbara?

97 Tyrone and Wilfred are playing a game. Each player has a paper with a square on it, and some markers. The square is divided into 4 columns across and 4 rows down. The object of the game is to be the first player to put 12 markers in the 12 boxes so that each row and each column has a total of 3 markers in it. How fast can you do this?

98 Brad was dealing out the cards for Neal. After he dealt out 4 cards, he told Neal to turn them over. "Now," he said, "how many different ways can you arrange your four cards in a stack?" Neal had these four cards: 3, 5, 7, and 9. How many ways are there?

99 It was a hot day in August. Jeanine and Lorenzo went exploring to find an ice cream store. They went right from their apartment house, and straight for 6 blocks. They turned right at A.J.'s Fish and Chips, and went straight for 4 blocks. At the Miracle Cleaners they turned left, and went straight 2 blocks. They stopped at the library and turned left. After going straight for 10 blocks, they found Frozen Fantasy. After getting some ice cream, what was the quickest way home for Jeanine and Lorenzo?

100 The magic show was almost over. Mario was getting ready to do his famous banner trick. He pulled banners made out of flags from a top hat. First he pulled out a banner made up of 14 flags. Next he pulled out a banner made up of 23 flags. The third banner was made up of 18 flags, and the fourth banner was made up of 27 flags. The fifth banner was made up of 22 flags. Mario stopped his banner trick when there were more than 50 flags in the banner. How many banners did Mario pull out of the hat?

101 At the garden statue store:
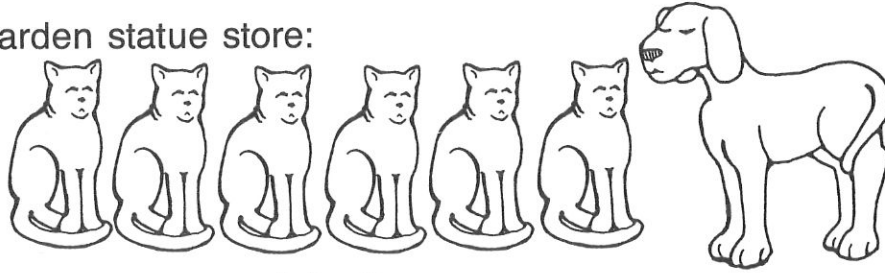
weighs the same as
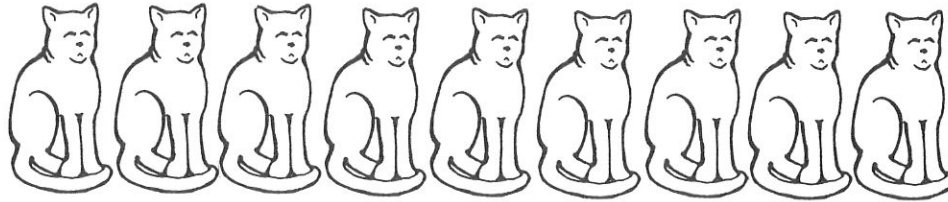
If [cat] weighs 4 pounds, then what does [dog] weigh?
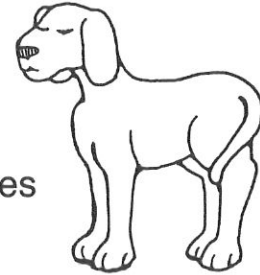
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102 Claudia was making a design for her little sister with blocks. Can you finish the design?
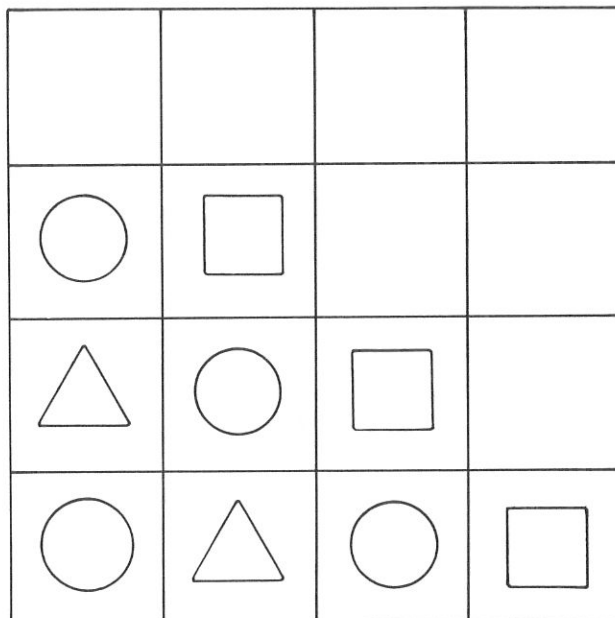
103 Gerald, his sister, and his brother all have paper routes. One Sunday Gerald's sister and brother had the flu, so Gerald had to deliver all 384 papers by himself. He had to deliver 106 more papers north of Main Street than south of Main Street. How many papers did Gerald deliver north of Main Street and how many papers did he deliver south of Main Street?

104 The Wizard at Windows is washing all the windows in the building at 946 Third Street. There are 9 floors in the building and 12 offices on each floor, 6 offices across the back of the building and 6 offices across the front of the building. The outside wall of each office has 2 windows. How many windows does the Wizard have to wash?

105   Bonnie and her father and mother are going to the ball game. There are 12 different gates from the outside. Then there are 16 different stairways into the stadium. How many different ways can Bonnie and her mother and father go into the stadium?

- -

106   Blaine, Treavor, Deanna, and Aniko all love animals and they each have one of these animals for a pet: a snake, a llama, a chicken, and a goat. Blaine hates snakes. Deanna has a pet that can carry a pack, and Treavor likes fresh eggs for breakfast. Can you match the people with their pets?
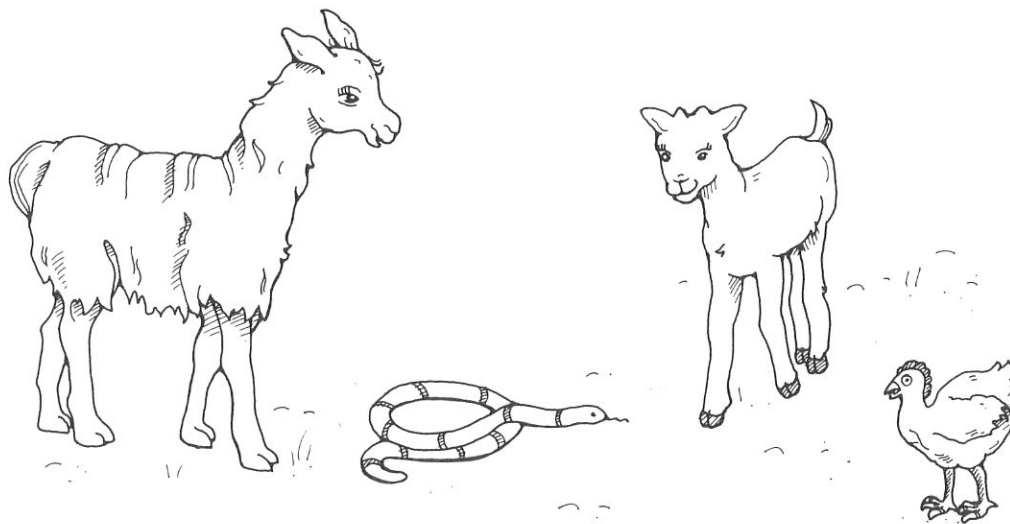
107 Jay noticed that each day he was in the sun he got new freckles. On Friday he counted 31 new freckles, and the day before he had gotten 7 fewer new freckles. Beginning on Tuesday he had gotten 7 more new freckles each day than he had gotten the day before. During the five days, how many new freckles did Jay get?

- -

108 Can you replace the letters with numerals to make a true equation?

$$\begin{array}{r} A\,A \\ +\,A\,A \\ \hline B\,B\,C \end{array}$$

109 Jim's Market couldn't keep Crunchy Critter Crackers in stock. Jim started with 300 boxes but everyone wanted them. The first day Jim sold 6 boxes, and on the second day he sold 14 boxes. Each day 8 more boxes were sold than the day before. So after two days, he had sold 20 boxes. If he kept selling the crackers at this rate, when would Jim run out of Crunchy Critter Crackers?

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110 Mary Ellen and Shing were at the park, clapping for the monkey as it did tricks to the music. When the monkey passed the hat, Mary Ellen and Shing put in 13 coins. Together they gave the monkey 25 cents. What coins did they put in the hat?

111 Samantha and Cindy were in a canoe race. They had to race 150 yards. The wind was blowing very hard on the lake. After the first minute Samantha was 35 yards from the starting point and Cindy was 25 yards. After the second minute Samantha and Cindy were both 30 yards from the starting line. At the end of three minutes Samantha was 65 yards and Cindy 55 yards from the starting line. After four minutes both Samantha and Cindy were 60 yards from the starting line. If they kept going at the same rate, who won the race and how many minutes did it take her?
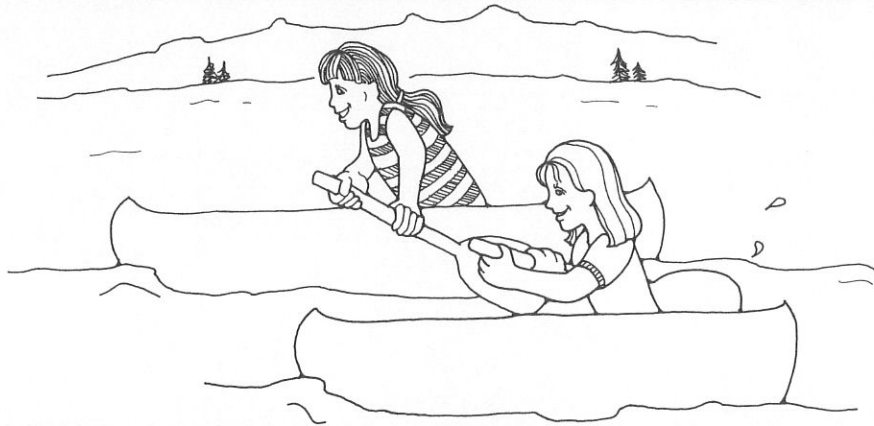
112 When Merilee goes to the building where her mother works, she can go through 3 different doors into the lobby. Then she can go to the 7th floor by taking 3 different elevators or 2 different stairways. How many different ways can Merilee get from outside the building to her mother's office on the 7th floor?

113 Ann and Marie are on the same team in a trivia game. Each team answers questions that are on blue cards worth 7 points, and yellow cards worth 9 points. Ann and Marie's team have 128 points so far. How many of the questions they have answered were on blue cards and how many were on yellow cards?

- -

114 Ferdinand is a magician who loves flowers. He has part of a field planted with flowers that keeps doubling in size every day. From the time that the first flower appears until the field is covered takes about 40 days. On what day is the field half covered?

115 Muriel and Betty are stacking cartons in the middle of the room. They are stacking the cartons side by side, 2 rows of 9 cartons across and 6 cartons high. They have to mark each carton where there is a side facing out, except for the tops of the cartons. How many sides do they have to mark?

116 They were painting a huge mural at Los Amigos School. They started on Monday and finished on Friday, when they painted 12 feet. Each day they painted $2\frac{1}{2}$ more feet than the day before. How many feet long was the mural?

117 With loud beeps, the spaceships from the planets Morunda and Boranda touched down. The Morunda spaceships each landed on 8 robot "feet," and the Boranda spaceships each landed on 12 robot "feet." When the spaceships left, someone counted 208 "feet" marks in the dust. How many spaceships had been there from each planet?
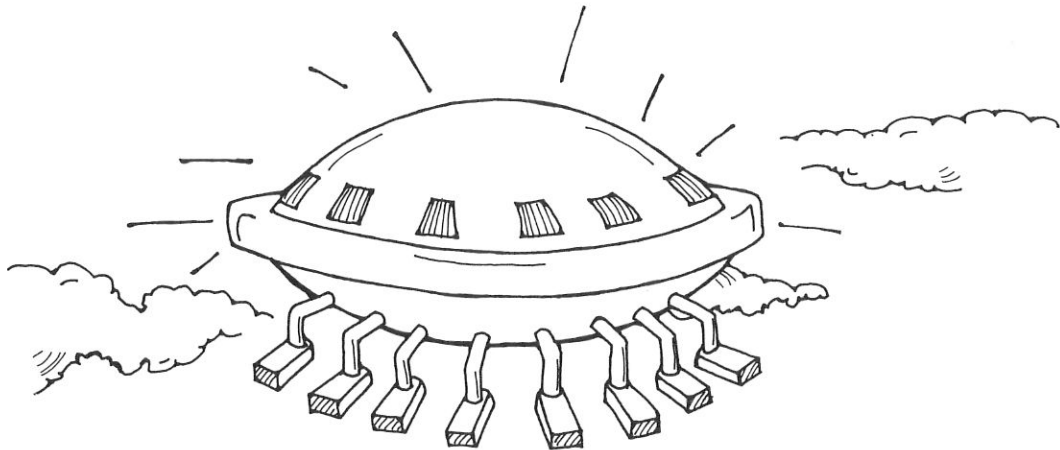
118 Kurt was helping to put in a new tile walkway. What are the next two rows in the walkway?
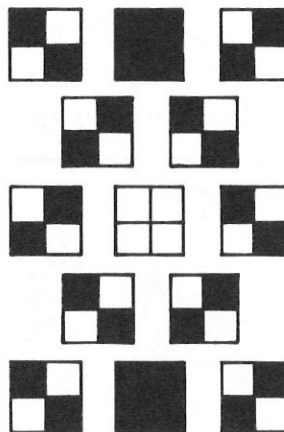
119 Lloyd, Toby, Pepe, and Gene were talking one day about where they would like to live: a farm, a boat, a mountain cabin, and with a circus. Toby hates to travel. Pepe loves the ocean, and Gene loves to plant things and watch them grow. Which place to live do you think each person would choose?

120 The four girls washed the neighbor's dog for 50 cents. They didn't know how to divide the money, so the dog owner said: "I will give the four of you $\frac{4}{5}$ of the total amount. To the first one to tell me how much that is, I will give $\frac{1}{2}$ of the other $\frac{1}{5}$." If someone gave the dog owner the right answer, how did the money get divided up?

Solutions

1

7 9 25
12 15

2

Rachel Randy Robert
Ramona Rhonda Rollie
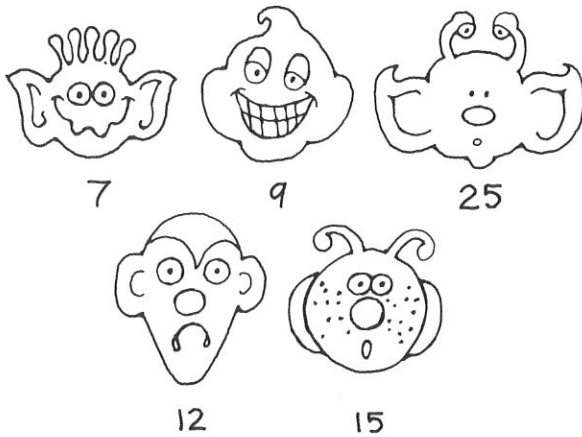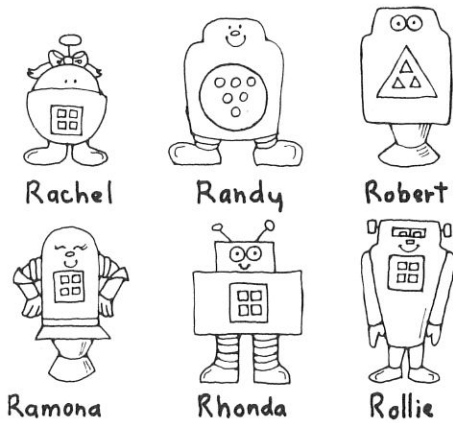
3 18

4 27

5 160

6 80

7 6

8 24

9 15

10 12

11 6

12 12

13 Monica = 75, Marty = 30

14 Amy = 7, Marcus = 3½

15

Cathy	Bobby
Eric	Dorothy
Abby	Forrest

16

orange juice	ice cream	pizza
vegetables	french fries	fish

17
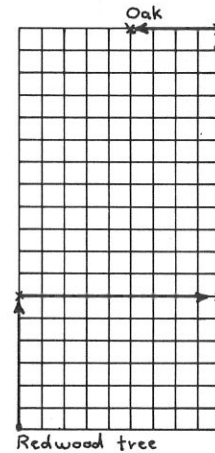
18
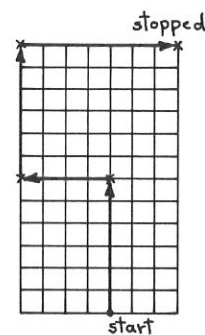
19 5 years

20 4

21 7

22 7

23

R	G	B	Y
Y	B	G	R
G	R	Y	B
B	Y	R	G

24

	M	T	W	Th	F
9:00	A	B	C	D	E
10:00	E	C	A	B	D
11:00	B	E	D	C	A
12:00	D	A	B	E	C
1:00	C	D	E	A	B

25 76

26 12

27 August

28 9

29 63

30 55

31 20

32 36

33 $7.00

34 36 ounces

35 Eleven 15-point, five 10-point

36 8 witches, 5 ghosts

37

⊘	⊗	△	⊘	⊗
⊗	△	⊘	⊗	△
△	⊘	⊗	△	⊘
⊘	⊗	△	⊘	⊗
⊗	△	⊘	⊗	△

38 30

39 Gigi—animal trainer, Evan—clown, Amelia—juggler, Collin—trapeze artist

40 Luis—"Trolls From Outer Space," Trina—"Singing in the Snow," Avi—"The Yellow Ghost," Roxanne—"The Lost Pelican"

41 45 tomato plants, 7 pumpkin vines

42 265 silver, 140 blue

43 45

44 150 feet

45 44

46 344

47 $5 is always better than $1

48 Never, because the ladder rises with the boat.

49 27

T-shirt	Towel	Play with
r	s	f
r	p	f
r	d	f
r	s	K
r	p	K
r	p	K
r	s	b
r	p	b
r	d	b
g	s	f
g	p	f
g	d	f
g	s	f
g	p	K

T-shirt	Towel	Play with
g	d	K
g	s	b
g	p	b
g	b	b
b	d	f
b	s	f
b	p	f
b	d	f
b	s	K
b	p	K
b	d	K
b	s	b
b	p	b
b	d	b

50

Laura — Marianne — Stefano — John — Taro

51 315

2̶7̶5̶   2̶8̶0̶   2̶7̶5̶   2̶8̶0̶   2̶7̶5̶   3̶2̶0̶
3̶8̶5̶   3̶8̶0̶   315   3̶2̶0̶   3̶8̶5̶   3̶7̶5̶

52 11

Birds   Bears   Monkeys   Seals   Elephants

53 60

365
356
635
653
536
563

54 Amelio = 90 minutes
Georgio = 30 minutes

55

Sean	Lee	Dina
Jiro	Elsa	Cam

56

out ↑   start
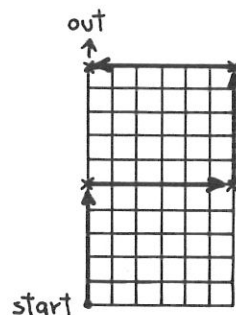
57 12

15-cent	10-cent	5-cent
3		
2	1	1
2		3
1	3	
1	2	2
1	1	4
1		6
	4	1
	3	3
	2	5
	1	7
		9

58 5 days later

	1	2	3	4	5	6
Dave	25	26	27	28	29	30
Dan	5	6	7	8	9	10

59 40 hot dogs, 10 ribs, 2 chicken

60 1 hour

	10	20	30	40	50	60
Picked		32	43	54	65	76
Total	21	53	96	150	215	291
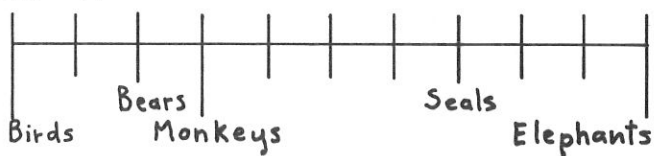
61

C	P	Tn	B	Tk
Tk	Tn	C	P	B
P	Tk	B	Tn	C
B	C	P	Tk	Tn
Tn	B	Tk	C	P

62 $12.00

63 20

Freaky	5	7	9	11	13	15	17	19	21	23	25
Harlow	5	9	8	12	11	15	14	18	17	21	20

64 1

Week	1	2	3	4	5	6	7	8	9
Books left	17	16	13	12	9	8	5	4	1

65 10 at 22 cents, 11 at 29 cents

	22 cents	29 cents
1	22	29
2	44	58
3	66	87
4	88	116
5	110	145
6	132	174
7	154	203
8	176	232
9	198	261
10	(220)	290
11	242	(319)

66 192

P^1 P^2 P^3 P^4

T^1 T^2 T^3 T^4 T^5 T^6

G^1 G^2 G^3 G^4 G^5 G^6 G^7 G^8
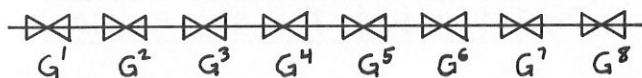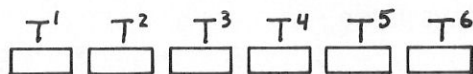
67 75

hour	fish
4	40
3	20
2	10
1	5

68 Ralph—gymnastics, Iris—track,
Rudolfo—high-jump, Maxine—swimming

	Ralph	Iris	Rudolfo	Maxine
track	N	Y	N	N
swimming	N	N	N	Y
high jump	N	N	Y	N
gymnastics	Y	N	N	N

69

70 270 1~~90~~ 2~~00~~ 2~~10~~ 2~~20~~ 2~~30~~ 2~~40~~
2~~50~~ 2~~60~~ 270 2~~80~~ 2~~90~~ 3~~00~~

71 54
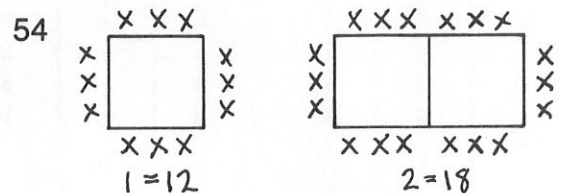
1 = 12   2 = 18

Tables	Seats
1	12
2	18
3	24
4	30
5	36
6	42
7	48
8	54

72 147

90 soccer
$\frac{1}{2} \times 90 = 45$ – baseball or softball
$\frac{1}{5} \times 45 = 9$ – basketball
$\frac{1}{3} \times 9 = 3$ – tennis

73 6 days

Day	1	2	3	4	5	6	7
Ladybugs	20	35	50	65	80	95	
Total	20	55	105	170	250	345	

74 Lisa—8½ minutes
Angie—4¼ minutes

75 18

b	s	r		g	s	r
b	bl	r		g	bl	r
b	br	r		g	br	r
b	s	p		g	s	p
b	bl	p		g	bl	p
b	br	p		g	br	p
b	s	y		g	s	y
b	bl	y		g	bl	y
b	br	y		g	br	y

76 28

Martha   Clayton Rita   William   James

77

Brent   Sergio   Dylan   Tony   Emilio   Darren

78

records & tapes	books	toys
t-shirts	jewelry	posters

79 16

11	44	66	88
14	46	68	81
16	48	61	84
18	41	64	86

80 6 days

Day	1	2	3	4	5	6
Toshio-8	9	10	11	12	13	14
Sumi-1	2	3	4	5	6	7

81 Week 12

Day	1	2	3	4	5	6
skateboard	20	27	31	38	42	49

Day	7	8	9	10	11	12
skateboard	53	60	64	71	75	82

82

A
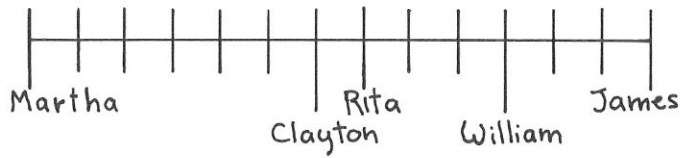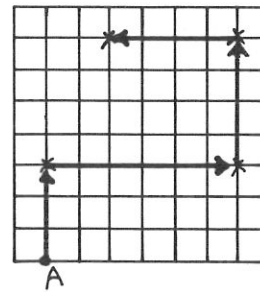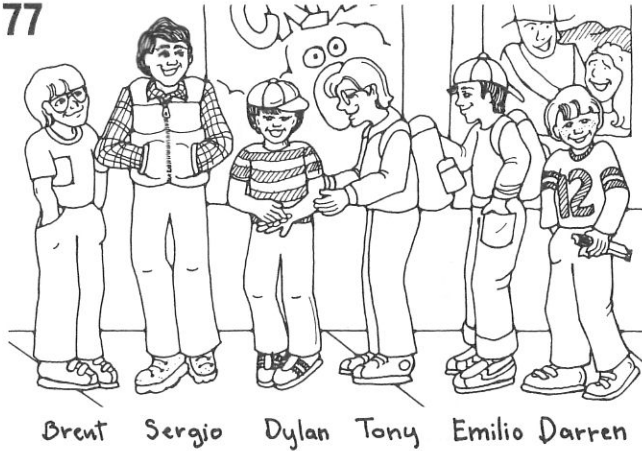
83

B	W	Y	P	R
R	Y	B	W	P
W	R	P	Y	B
P	B	W	R	Y
Y	P	R	B	W

84 18

25 cents	10 cents	5 cents	1 cent
1		1	2
1			7
	3		2
	2	2	2
	2	1	7
	2		12
1		4	2
1		3	7
1		2	12
1		1	17
1			22
		6	2
		5	7
		4	12
		3	17
		2	22
		1	27
			32

85 12 hours—red
13 hours—yellow

Hour	1	2	3	4	5	6	7
Yellow	8	12	15	19	22	26	29
Red	8	15	16	23	24	31	32

Hour	8	9	10	11	12	13
Yellow	33	36	40	43	47	50
Red	39	40	47	48	55	56

86 134

88 stars
$\frac{1}{4} \times 88 = 22$ UFO's
$22 - 4 = 18$ moons
$\frac{1}{3} \times 18 = 6$ strange objects
Total = 134

87 136 cans

88 Gwen—8 miles
Russell—7 miles

	15 cents	25 cents
1	15	25
2	30	50
3	45	75
4	60	100
5	75	125
6	90	150
7	(105)	175
8	120	(200)

89 308   2̶8̶0̶ 2̶8̶4̶ 2̶8̶8̶ 2̶9̶2̶ 2̶9̶6̶ 3̶0̶0̶
3̶0̶4̶ 308 3̶1̶2̶ 3̶1̶6̶

90 50 pennies, 45 nickels

91

E   D   C   A   B

92
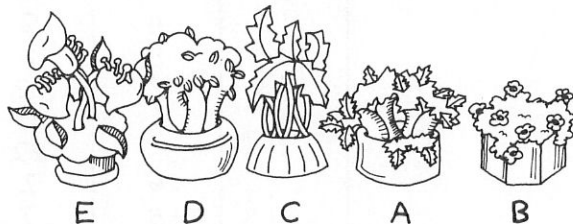
Lana	Gerald	Lara
Meredith	Farley	Sam

93 27

wheat	c	l		rye	c	l		white	c	l
w	t	l		r	t	l		w	t	l
w	h	l		r	h	l		w	h	l
w	c	t		r	c	t		w	c	t
w	t	t		r	t	t		w	t	t
w	h	t		r	h	t		w	h	t
w	c	s		r	c	s		w	c	s
w	t	s		r	t	s		w	t	s
w	h	s		r	h	s		w	h	s

94 23

23 → +2
    → +16
    → +7
    → −3
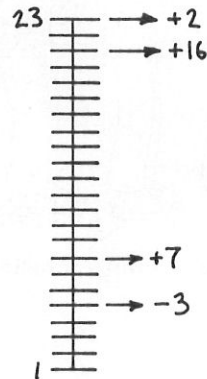
95 yellow = 144, other = 36

96 14 weeks

Day	1	2	3	4	5	6	7
Barbara 8	9	10	11	12	13	14	15
Janet 4	6	8	10	12	14	16	18

Day	8	9	10	11	12	13	14
Barbara 8	16	17	18	19	20	21	22
Janet 4	20	22	24	26	28	30	32

97

X	X		X
	X	X	X
X	X	X	
X		X	X

98 24

3579	5379	7359	9357
3597	5397	7395	9375
3759	5739	7539	9537
3795	5793	7593	9573
3957	5937	7935	9735
3975	5973	7953	9753

99

start

100 16 banners

Banner	1	2	3	4	5	6	7	8
Flags	14	23	18	27	22	31	26	35

Banner	9	10	11	12	13	14	15	16
Flags	30	39	34	43	38	47	42	51

101 12 pounds

102

103 245 north of Main St.
139 south of Main St.
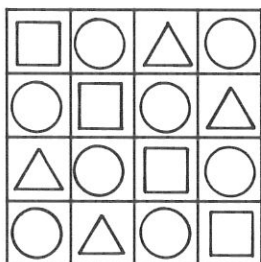
104 288

Floor	1	2	3	4	5
Total Windows	32	64	96	128	160

Floor	6	7	8	9
Total Windows	192	224	256	288

105 192

S^1 S^2 S^3 S^4 S^5 S^6 S^7 S^8 S^9 S^{10} S^{11} S^{12} S^{13} S^{14} S^{15} S^{16}

G^1 G^2 G^3 G^4 G^5 G^6 G^7 G^8 G^9 G^{10} G^{11} G^{12}

106 Blaine—goat, Deanna-llama, Trevor—chicken, Aniko—snake

	Blaine	Deanna	Trevor	Aniko
snake	N	N	N	Y
llama	N	Y	N	N
chicken	N	N	Y	N
goat	Y	N	N	N

107 85

Fr	Th	W	Tu	M
31	24	17	10	3
	-7	-7	-7	-7

108

$$\begin{array}{r} 55 \\ +\ 55 \\ \hline 110 \end{array}$$

109 9 days

Day	1	2	3	4	5
Sold	6	14	22	30	38
Total Sold	6	20	42	72	110

Day	6	7	8	9
Sold	46	54	62	70
Total Sold	156	210	272	300+

110 3 nickels, 10 pennies

25 cents	10 cents	5 cents	1 penny
1			
	2	1	
	2		5
		5	
		4	5
		(3	10)
		2	15
		1	20
			25

111 Samantha—9 minutes

Minute	1	2	3	4	5
Samantha	35	30	65	60	95
Cindy	25	30	55	60	85

Minute	6	7	8	9
Samantha	90	125	120	155
Cindy	90	115	120	145

112 15
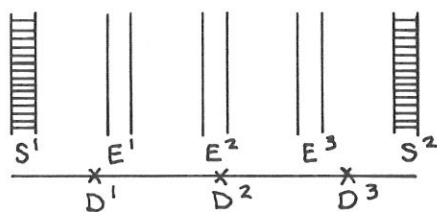
113 8 blue, 8 yellow

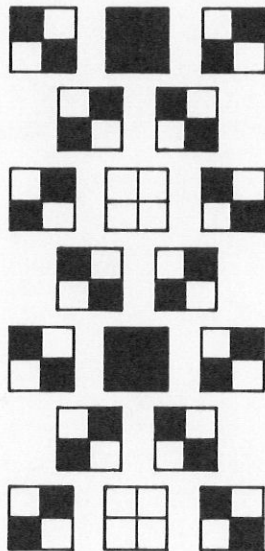| 7 points	9 points
1 – 7	9
2 – 14	18
3 – 21	27
4 – 28	36
5 – 35	45
6 – 42	54
7 – 49	63
8 – ⑤⑥	⑦②

114 39th day

115 132

2   cartons = 6
4   cartons = 8
6   cartons = 10
8   cartons = 12
10 cartons = 14
12 cartons = 16
14 cartons = 18
16 cartons = 20
18 cartons = 22
6×22 cartons = 132

116 35 feet $\dfrac{5}{12}$ $\dfrac{4}{9\frac{1}{2}}$ $-2\frac{1}{2}$ $\dfrac{3}{7}$ $-2\frac{1}{2}$ $\dfrac{2}{4\frac{1}{2}}$ $-2\frac{1}{2}$ $\dfrac{1}{2}$ $-2\frac{1}{2}$

117 10 Borandas   or   14 Morundas
11 Morundas   8 Borandas

118

119 Toby—mountains, Gene—farm, Pepe—boat, Lloyd—circus

	Toby	Gene	Pepe	Lloyd
mountains	Y	N	N	N
boat	N	N	Y	N
farm	N	Y	N	N
circus	N	N	N	Y

120 3 girls got 10 cents, 1 girl got 15 cents, and the dog owner saved 5 cents!