

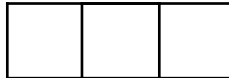
Name _____

Justify all answers by showing your work or by providing a coherent explanation. Please circle your answers.

1. Joe's Pizza House has 3 choices for salad, 15 different pizzas and 4 varieties of dessert. How many different three-course meals can be ordered?

2. The telephone prefix for the university is 408. The prefix is followed by four digits. How many different telephone numbers are possible before a new prefix is needed?

3. How many designs of the form below are possible, if each square must either be red, green, or blue, and no to adjacent squares may be of the same color?



4. Sally has four red flags, three green flags, and two white flags. How many nine flag signals can she run up a flagpole?

5. How many ways can 7 books be arranged if:
 - a) only 4 are to be used at a time?

 - b) 2 of the books are identical?

 - c) the books are to be placed in a circle?

 - d) 3 of the books are to remain together?

6. An ice cream parlor offers two scoops of vanilla ice cream and the following optional toppings:

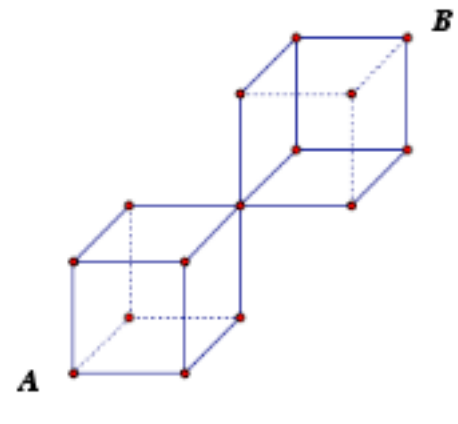
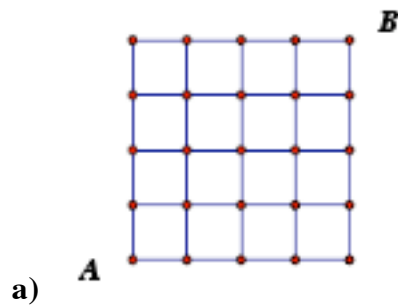
chocolate syrup | banana slices | cherries | nuts | whipped cream

How many different ways can the vanilla ice cream be served?

7. License plates in a certain state have three letters followed by three digits. How many different plates are possible if no adjacent duplicates of letters or numbers are allowed?

8. A basketball coach was criticized in the newspaper for not trying every combination of his 12 players. How many 5 player combinations are possible?

9. Find the number of shortest paths from point *A* to point *B*.



10. From a group of 10 boys and 12 girls, a committee of 5 students must be chosen. How many committees must have **at least** 2 girls?