MTH 150 Test 2
Spring 2020

Elementary Statistics

Name _____

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

1. Assume that females have pulse rates that are normally distributed with a mean of 73.0 beats per minute and a standard deviation of 12.5 beats per minute. If 1 adult female is randomly selected, find the probability that her pulse rate is less than 76 beats per minute.

a. 0.594 **b.** 0.405 **c.** 0.555 **d.** 0.652

2. The mean salary for nurses in a certain hospital is $62,497. The standard deviation is $7,250. Assume that the salary is normally distributed. Find the probability that a starting nurse will make more than $65,000.

a. 0.643 **b.** 0.734 **c.** 0.364 **d.** 0.919

3. A bottler of drinking water fills plastic bottles with a mean volume of 999 milliliters(mL) and standard deviation 5 mL. The fill volumes are normally distributed. What proportion of bottles have volumes between 992 mL and 998 mL?

a. 0.421 **b.** 0.645 **c.** 0.339 **d.** 0.081

4. Replacement times for CD players are normally distributed with a mean of 7.1 years and a standard deviation of 1.4 years (data from *Consumer Reports*). If you are the manufacturer and want to provide a warranty such that 98% of the players need replacement after the warranty expires, how long should the warranty period be?

a. 2.054 **b.** 15.500 **c.** 9.976 **d.** 8.750

5. The distribution of cholesterol levels in teenage boys is approximately normal with a mean of 170 and a standard deviation of 30. (Source: U.S. National Center for Health Statistics). Levels above 200 warrant attention. Find the probability that a teenage boy has a cholesterol level greater than 200.

a. 0.841 **b.** 0.159 **c.** 0.342 **d.** 0.214

6. The Vitamin C content of a particular brand of vitamin supplement pills is normally distributed with mean 490 mg and standard deviation 12 mg. What is the probability that a randomly selected pill contains at least 500 mg of Vitamin C?

a. 0.797 **b.** 0.833 **c.** 0.052 **d.** 0.203

7. The time it takes a supercomputer to perform a task is normally distributed with mean 10 milliseconds and standard deviation 4 milliseconds. What is the probability that it takes more than 18.2 milliseconds to perform the task?

$p(z \geq 2.05) = 0.0202$

8. The amount of time it takes to properly interview a candidate for a certain kind of job,has a normal distribution with a mean of 20 minutes and a standard deviation of 5 minutes. Assuming that all candidates show up for the interview, at most how many candidates should be called in a day with 8 working hours, so that one can be more than 99% certain of finishing the interviews within the working day?

$0.99 \Rightarrow z = 3.326 \Rightarrow x = 31.633$ or 31 minutes
so 8 hr x 60 min = 480 min divided by 31 min
per interview implies about 15 people.

9. An airline knows from experience that the distribution of the number of suitcases that get lost each week on a certain route is approximately normal with a mean of 15.5 and a standard deviation of 3.6. What is the probability that during a given week the airline will lose less than 20 suitcases?

$p(z \leq 1.25) = 0.894$

10. The data shown represent the cigarette tax (in cents) for 6 randomly selected states

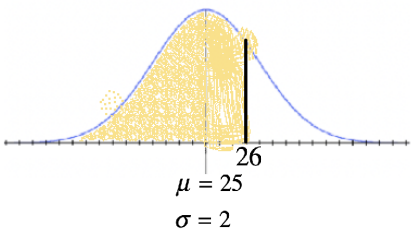
13, 58, 25, 65, 17, 48

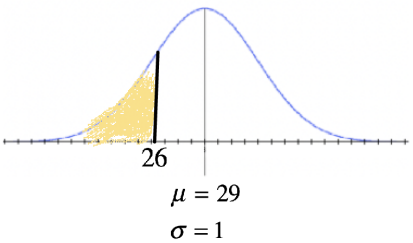
What per cent of all the states would have cigarette taxes above \$0.35 ?

Ryan-Joyner => normal data, so, \$0.35 $\Rightarrow z = -0.120 \Rightarrow$ 54.7 %

11. Times for a surgical procedure are normally distributed. There are two methods. Method A has a mean of 25 minutes and a standard deviation of 2 minutes, while method B has a mean of 29 minutes and a standard deviation of 1.0 minutes. Which procedure is preferred if the procedure must be completed within 26 minutes?

$p_A(z \leq 0.5) = 0.691$ $\quad p_B(z \leq -3.0) = 0.001$





12. A safety engineer feels that 35% of all industrial accidents in her plant are caused by failure of employees to follow instructions. She decides to look at the accident reports (selected randomly and replaced in the pile after reading) until she finds one that shows an accident caused by failure of employees to follow instructions. What is the probability that the safety engineer will have to examine at least three reports until she finds a report showing an accident caused by employee failure to follow instructions?

$p_4(x = .35) = (0.65)(0.65)(0.65)(0.35) = 0.0961$