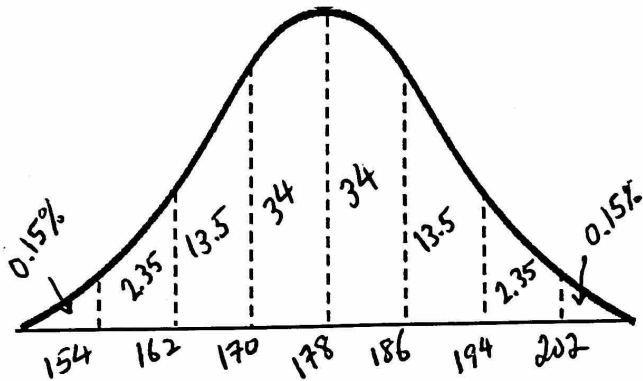Unit 9.12b Test Review WS #2 - Statistics

Directions: Draw and label normal distribution curves, then answer the questions.

1. The weights of the 50 football players are normally distributed with a mean of 178 pounds and a standard deviation of 8 pounds.	**a)** What percent of the players weigh between 178 lbs and 194 lbs? 47.5%
	b) What is the probability that a player weighs at most 170 lbs? $P(x \le 170) = 16\%$
	c) What is the probability that a player weighs less than 162 lbs or greater than 194 lbs? $2.5\% + 2.5\% = 5\%$
	d) How many players weight between 170 lbs and 186 lbs? 68% of 50 players $50(0.68) =$ $\boxed{34 \text{ players}}$

0.15%   2.35   13.5   34   34   13.5   2.35   0.15%
154   162   170   178   186   194   202

2. Identify the population and the sample:

a) A survey of 1353 American households found that 18% of the households own a computer.

population: all American households
sample: collection of 1353 households surveyed

b) A recent survey of 2625 elementary school children found that 28% of the children could be classified obese.

population: all elementary school children
sample: collection of 2625 children surveyed

c) The average weight of every sixth person entering the mall within 3 hour period was 146 lb.

population: all people entering mall in 3 hr. period
sample: every 6th person in 3 hr. period

3. Determine whether the numerical value is a parameter or a statistics (and explain):

a) A recent survey by the alumni of a major university indicated that the average salary of 10,000 of its 300,000 graduates was 125,000.

statistic - part of 300,000 graduates

b) The average salary of all assembly-line employees at a certain car manufacturer is $33,000.

parameter - all assembly-line employees were included in the study

c) The average late fee for 360 credit card holders was found to be $56.75.

statistic - 360 (but not all) credit cards were examined

4. For the studies described, identify the population, sample, population parameters, and sample statistics:

a) In a USA Today Internet poll, readers responded voluntarily to the question "Do you consume at least one caffeinated beverage every day?" population: all Readers of USA today

Sample: volunteers responding to survey

population parameter: percent of readers who have at least one caffeinated drink among all readers

sample statistic: percent of caffeine drinkers among those who responded.

b) Astronomers typically determine the distance to galaxy (a galaxy is a huge collection of billions of stars) by measuring the distances to just a few stars within it and taking the mean (average) of these distance measurements.

population: all stars in galaxy

Sample: the selected stars chosen for measurement

population parameter: mean (avg) of distances b/t all stars and Earth

sample statistic: mean of distances found in the sample of stars.

5) The length of a certain fish species is normally distributed with a mean of 15 cm. If a fish in this species is 18.8 cm with a z-score of 1.9, what is the standard deviation?

$$z = \frac{x - \bar{x}}{\sigma}$$

$\bar{x} = 15$
$x = 18.8$
$z = 1.9$
$\sigma = \_?$

$$\frac{1.9}{1} = \frac{18.8 - 15}{\sigma}$$

$$1.9\sigma = 3.8$$

$$\sigma = \frac{3.8}{1.9}$$

$$\boxed{\sigma = 2}$$

Use for questions 39-42: The shoe sizes of the 36 students in Samantha's PE class are normally distributed with a mean of 8.5 and a standard deviation of 1.5.

39. What percent of the students have a shoe size between 7 and 11?

$$z = \frac{7 - 8.5}{1.5} = -1 \rightarrow 0.1587$$

$$z = \frac{11 - 8.5}{1.5} = 1.667 \rightarrow 0.9525$$

$P(7 \le x \le 11)$
$= 0.9525 - 0.1587$
$= \boxed{0.7938}$

40. What is the probability that a student will have a maximum shoe size of 9.5?

$$z = \frac{9.5 - 8.5}{1.5} = 0.67 \rightarrow 0.7486$$

$$P(x \le 9.5) = \boxed{0.7486}$$

41. Approximately how many students wear at least a size 6?

$$z = \frac{6 - 8.5}{1.5} = -1.67 \rightarrow 0.0475$$

$$P(x \ge 6) = 1 - 0.0475$$

$$= \boxed{0.9525}$$

42. Approximately how many students wear a shoe size between 8 and 10?

$$z_8 = \frac{8 - 8.5}{1.5} = -0.33 \rightarrow 0.3707$$

$$z_{10} = \frac{10 - 8.5}{1.5} = 1 \rightarrow 0.8413$$

$$0.8413 - 0.3707 = 0.4706$$

$$0.4706(36) = 16.94 \approx 17 \text{ students}$$