

Unit 7: Data

Do and Check

Name _____

Date _____

Period _____

Identify the population and sample in each situation:

- 1) Researchers poll every fifteenth voter after a school board election.

population: all voters

sample: every 15th voter

- 2) A swim instructor asks 5 of his students which stroke they prefer.

population: all students of the instructor

sample: the 5 students surveyed.

The manager of a supermarket is conducting a customer survey. State whether each sampling method is random or not random. Explain your answer.

- 3) The manager surveys customers in the store every Monday morning.

not random.

example: the same people may shop at the store every Monday morning.

example: you would not have an equal chance of surveying workers versus stay-at-home parents.

- 4) The manager questions 200 customers who were randomly selected from a list of customers.

random.

If we have no knowledge of the 200 customers and they were picked from a list, the sample is random.

- 5) The manager questions only customers who shop with children.

not random.

example: customers who are single, without children, or elderly would automatically be excluded from the survey results.

- 6) A student thinks that school bus stops in his community are too far apart. He surveys all the students in his class to see what they think. What is the population? Is the sampling method random?

population: the student's class.
not random: He did not survey students from all grades randomly. Students in a higher grade may be less likely to like the bus while younger students may not mind.

- 7) Some commuters into Boston were asked how many minutes they lived from work. Their responses were 15, 7, 14, 21, 5, 9 and 12. Find the mean, median, mode and range of their times.

order the data:

5, 7, 9, 12, 14, 15, 21

mean: add the #'s and divide by 7.

$$\frac{5+7+9+12+14+15+21}{7} = \frac{83}{7} = 11.857$$

mode: there is no mode.

median: 5, 7, 9, 12, 14, 15, 21

the middle # in the data

range: $21 - 5 = \boxed{16}$

Would you use mean, median, mode or range for each situation? Explain your answer.

8) Kevin noticed that half of the cereal brands in the store cost more than \$3.33.

median

- half of the data points are above and half are below so the middle number is \$3.33.

9) The average score on the last pre-algebra test was 85.

mean

average means the same thing as mean.

10) The most common height on the basketball team is 6ft. 11 in.

mode

This is the number that appears most often in the data set.

11) The heights of the players on the basketball team vary by 6 inches.

range

The difference between the tallest and shortest players on the team.

12) Carla has three tests scores of 84, 90 and 86. There is one more test during the semester. She wants to have at least a 90% average in the class. What grade does she need to get on the last test?

Algebraic method:

$$\frac{84 + 90 + 86 + X}{4} = 90$$

$$\frac{260 + X}{4} = 90$$

$$260 + X = 90(4)$$

$$\begin{array}{r} 260 + X = 360 \\ -260 \quad -260 \\ \hline X = 100 \end{array}$$

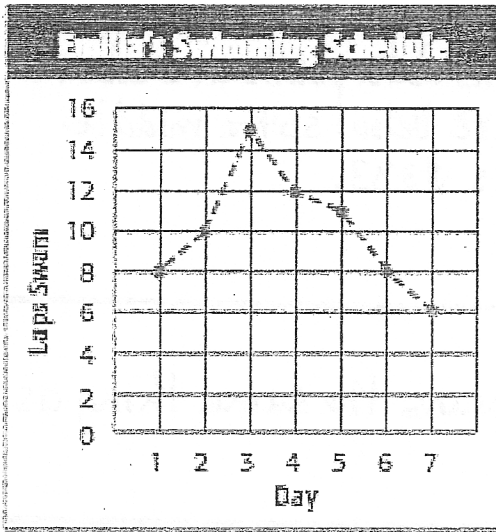
Model method:

Scores	84	90	86	X
Mean	90	90	90	90
deviation	-6	0	-4	+10

= 0

$$\begin{array}{l} X + 90 = 100 \\ 10 + 90 = 100 \end{array}$$

Find the mean, median, mode and range of the following data.



13) Mean:

$$\text{mean: } 8, 10, 15, 12, 11, 8, 6 = \frac{70}{7} = \boxed{10}$$

14) Median:

median: 6, 8, 8, $\boxed{10}$, 11, 12, 15
the middle number is 10.

15) Mode:

mode: # that appears most often.
 $\boxed{\text{mode} = 8}$

16) Range:

$$\text{range: } 15 - 6 = \boxed{9}$$

Write a B or U on the line before each statement labeling it as biased or unbiased.

17) _____ A phone-in survey is taken by a radio station to see how many listeners enjoy jazz in the morning.

B. Only the people who call-in are counted.

18) _____ A city councilman asks members of the ice hockey team if they would prefer a new skateboard park or a new ice rink to be built as the town building project.

B. Only hockey players are surveyed.

19) _____ Are you willing to deal with noisy, heavy increases in traffic where you live just so another unnecessary mall can be built (is this statement bias or unbiased).

biased
The question is asked in a prejudicial way. The words noisy, heavy and unnecessary could influence people's responses.

Answer the following questions:

20) Veterinary doctors marked 30 deer and released them. Later on, they counted 150 deer, 12 of which had marks. To the nearest whole number, what is the best estimate for the deer population?

$$\frac{\text{Sample}}{\text{actual population}} = \frac{30}{x} = \frac{12}{150}$$

$$12x = 4500$$

$$x = 375 \text{ deer population}$$

21) Andrew is planning what to buy for a garments store in downtown. He collected two random samples of 100 men regarding their men's wear preference? Make at least two inferences based on the results.

example: Jeans are a popular garment. They are the most popular garment in both sample survey results. Andrew should order plenty of jeans for his store.

Student sample	Jeans	Pants	Shorts	Total
#1	78	10	12	100
#2	64	22	14	100

example: On average, pants are slightly more popular than shorts.

pants 16%
shorts 13%

22) Calculate the Mean Absolute Deviation of the weekly allowance of middle school students. Be sure to show your steps! (Round the mean to nearest whole #)

Weekly Allowance of Middle School Students					
15	25	25	35	20	20
15	10	20	15	25	10

22)

$$\text{Mean} = \frac{235}{12} = 19.58 \approx 20$$

Absolute Deviations

$$15 \rightarrow 20 = 5$$

$$15 \rightarrow 20 = 5$$

$$25 \rightarrow 20 = 5$$

$$10 \rightarrow 20 = 10$$

$$25 \rightarrow 20 = 5$$

$$20 \rightarrow 20 = 0$$

$$35 \rightarrow 20 = 15$$

$$15 \rightarrow 20 = 5$$

$$20 \rightarrow 20 = 0$$

$$25 \rightarrow 20 = 5$$

$$20 \rightarrow 20 = 0$$

$$10 \rightarrow 20 = 10$$

65

MAD =

$$\frac{65}{12} = 5.42$$

3) A student plans to survey randomly selected spectators at a school football game. For which question will the sample be the MOST representative of the relevant population? Why?

- A. Which food should be added to the concession stands at the football stadium?
- B. Which activities should be offered for the school's activity day this year?
- C. How should we spend the money from the annual fundraiser?
- D. Which play should the drama club perform next?

23)

A. Spectators at a football game will be very interested in the snacks they can purchase during a game.