

## Population and Samples

### Multiple Choice

Identify the choice that best completes the statement or answers the question.

- \_\_\_ 1. A factory produces 42,000 computer monitors per day. The manager of the factory claims that fewer than 660 defective computer monitors are produced each day. In a random sample of 240 computer monitors, there are 2 defective computer monitors. Determine whether the manager's claim is likely to be true. Explain.
- Yes, the manager's claim is likely to be true. Based on the data, you can predict that there are 350 defective computer monitors produced per day.
  - No, the manager's claim is not likely to be true. Based on the data, you can predict that there are 670 defective computer monitors produced per day.
  - Yes, the manager's claim is likely to be true. Based on the data, you can predict that there are 355 defective computer monitors produced per day.
  - No, the manager's claim is not likely to be true. Based on the data, you can predict that there are 665 defective computer monitors produced per day.
- \_\_\_ 2. Ty makes balloon animals for birthday parties and wants to know what color balloons to buy. He surveys the 30 children closest to him. Identify the type of sampling method.
- self-selected
  - systematic
  - convenience
  - random
- \_\_\_ 3. A major university decides to survey the student body to find out their opinion about life on campus. They send an e-mail to all students, hoping that at least 10% of them respond. Identify the type of sampling method used (convenience, systematic, self-selected, or random).
- convenience
  - systematic
  - self-selected
  - random
- \_\_\_ 4. About 26% of all bicycles in the United States have off-road tires. Jing surveys a random sample of bicycles from two towns. Compare the samples with the national percentage.

Off-road Bicycle Tires		
Sample	Number with Off-Road Tires	Number without Off-Road Tires
Town A	12	8
Town B	5	15

- Town A: 150%; Town B: 33%  
The data suggest that the percent of bicycles with off-road tires in Town B is close to the national percent, but the percent of bicycles with off-road tires in Town A is greater than the national percent.
- Town A: 12%; Town B: 5%  
The data suggest that the percents of bicycles with off-road tires in Town A and Town B are less than the national percent.
- Town A: 60%; Town B: 25%  
The data suggest that the percent of bicycles with off-road tires in Town B is close to the national percent, but the percent of bicycles with off-road tires in Town A is greater than the national percent.
- Town A: 40%; Town B: 75%  
The data suggest that the percents of bicycles with off-road tires in Town A and Town B

are greater than the national percent.

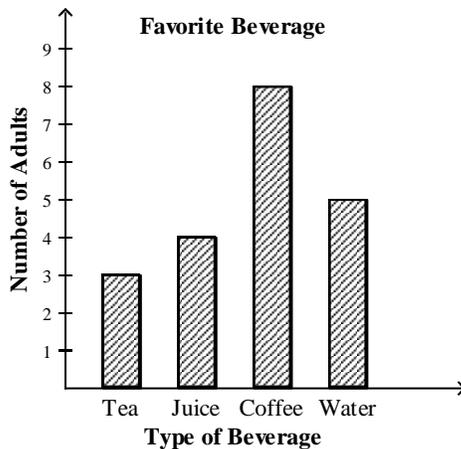
5. Determine whether the sample may be biased. Explain.  
The Candlelit-Dinner Candle Store surveys its Monday customers to find out their opinion on a new scented candle.
- The sample is not biased. It is a random sample.
  - The sample is biased. The sample does not include customers who shop there on days other than Monday.

6. Determine whether the claim is valid. Explain.  
Timone conducts a survey to find out what kind of beverage adults in his town prefer.

**Sample:** 20 adults at a coffee shop

**Question:** What is your favorite beverage?

**Claim:** Coffee is the most popular beverage among adults in Timone's town.



- The claim is probably not valid. The sample is not biased because adults at a coffee shop may be more likely to drink coffee than other adults would.
  - The claim may be valid. The sample is not biased because adults at a coffee shop may be more likely to drink coffee than other adults would.
  - The claim may be valid. The sample is biased because adults at a coffee shop may be more likely to drink coffee than other adults would.
  - The claim is probably not valid. The sample is biased because adults at a coffee shop may be more likely to drink coffee than other adults would.
7. The results of a survey show that track is the favorite sport for 11 out of 20 people. Which percent is closest to the probability that a person's favorite sport will NOT be track?
- 9%
  - 44%
  - 45%
  - 55%
8. Three machines at a cheese factory cut the blocks of cheese before they are wrapped. The weights of the cheeses are checked afterwards. The table below shows the weights, in ounces, of the cheese blocks from the three machines.

Cheese	Machine A	Machine B	Machine C
1	32	32	34
2	33	32	35

3	31	33	32
4	34	33	31
5	34	31	33
6	33	33	35
7	32	32	31
8	33	32	30
9	34	33	34
10	32	32	32

Which of the following is **best** supported by the data in the table?

- Machine B wastes the most cheese.
- Machine A is the most consistent.
- Machine C is the fastest.
- Machine C is the least consistent.

### Numeric Response

9. The data below is the height above sea level of five randomly-selected cities in a country.  
 930 ft                  1,035 ft                  832 ft                  1,154 ft                  1,543 ft  
 What is the median height in feet above sea level of a city in this country?

### Short Answer

- The manager of a book store surveys people who buy mystery novels to see if the store should expand its hours of operation. Identify the population and sample.
- A student surveys mathematics teachers to get their opinion on teaching. Identify the population and sample.
- A music store gives comment cards to all members of its Jazz Club to find out about satisfaction with the club's features. Identify the population and sample.
- The Fall Dance Committee surveys 20 seventh and eighth graders to see what music they would like to hear at the dance. Identify the population and sample.
- A United States senator from Maine wants to find out the opinion of the voters in his state on issues concerning education. The office of the senator sends out a survey to a random sample of voters registered as independents in the state of Maine. Is this sampling method random? Explain.
- At the premiere of the latest movie, a movie theater surveys every twentieth person who attended the premiere to get his or her opinion on the movie. Identify the sampling method used.
- Metropolitan Hospital is concerned about the satisfaction of its patients. There are too many patients to survey all of them, so they will ask every tenth patient how he or she feels about the quality of care. Tell whether the survey method could result in a biased sample. Explain.
- Marion Middle School has 600 students. Mike surveys a random sample of 30 students and finds that 7 of them play a musical instrument. How many students at the school are likely to play a musical instrument?

18. The results of a survey show that basketball is the favorite sport for 15 out of 50 people. What is the probability that a person's favorite sport will NOT be basketball? Write the probability as a percent?
19. Damon made 16 out of 20 free throw shots. About how many out of the next 30 free throw shots would you expect him to make?
20. Fifty students were asked what they believe their most important school subject is. Use the results shown in the circle graph to predict the number of students out of 250 that would choose math.

