

# LESSONS - PROBLEM SOLVING & DATA ANALYSIS

## Ratio, Proportion, Units, and Percentages

1. On Thursday, 240 adults and children attended a show. The ratio of adults to children was 5 to 1. How many children attended the show?
  - A) 40
  - B) 48
  - C) 192
  - D) 200
  
2. On an architect's drawing of the floor plan for a house, 1 inch represents 3 feet. If a room is represented on the floor plan by a rectangle that has sides of lengths 3.5 inches and 5 inches, what is the actual floor area of the room, in square feet?
  - A) 17.5
  - B) 51.0
  - C) 52.5
  - D) 157.5
  
3. Scientists estimate that the Pacific Plate, one of Earth's tectonic plates, has moved about 1,060 kilometers in the past 10.3 million years. About how far, in miles, has the Pacific Plate moved during this same time period? (Use 1 mile = 1.6 kilometers)
  - A) 165
  - B) 398
  - C) 663
  - D) 1,696

4. Country Y consists of two districts. One district has an area of 30 square miles and a population density of 370 people per square mile, and the other district has an area of 50 square miles and a population density of 290 people per square mile. What is the population density, in people per square mile, for all of Country Y?

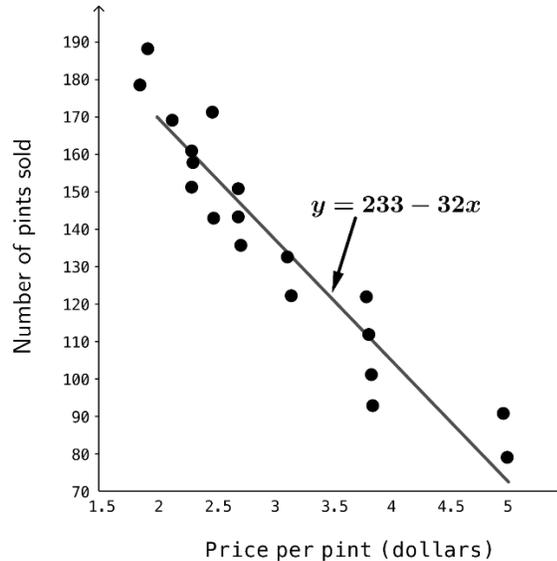
5. A furniture store buys its furniture from a wholesaler. For a particular table, the usual price of the table is 75% more than the cost of the table from the wholesaler. During a sale, the store sells the table for 15% more than the cost from the wholesaler. If the sale price of the table is \$299, what is the usual price for the table?

- A) \$359
- B) \$455
- C) \$479
- D) \$524

**END VIDEO 1**

## START VIDEO 2

### Interpreting Relationships Presented in Scatterplots, Graphs, Tables, and Equations



6. A grocery store sells pints of raspberries and sets the price per pint each week. The scatterplot above shows the price and number of pints of raspberries sold for 19 weeks, along with a line of best fit for the data and an equation for the line of best fit.
- A. According to the line of best fit, how many pints of raspberries would the grocery store be predicted to sell in a week when the price of raspberries is \$4.50 per pint?**
- B. For how many of the 19 weeks shown was the number of pints of raspberries sold greater than the number predicted by the line of best fit?**
- C. What is the best interpretation of the slope of the line of best fit in this context?**
- D. What is the best interpretation of the y-intercept of the line of best fit in this context?**

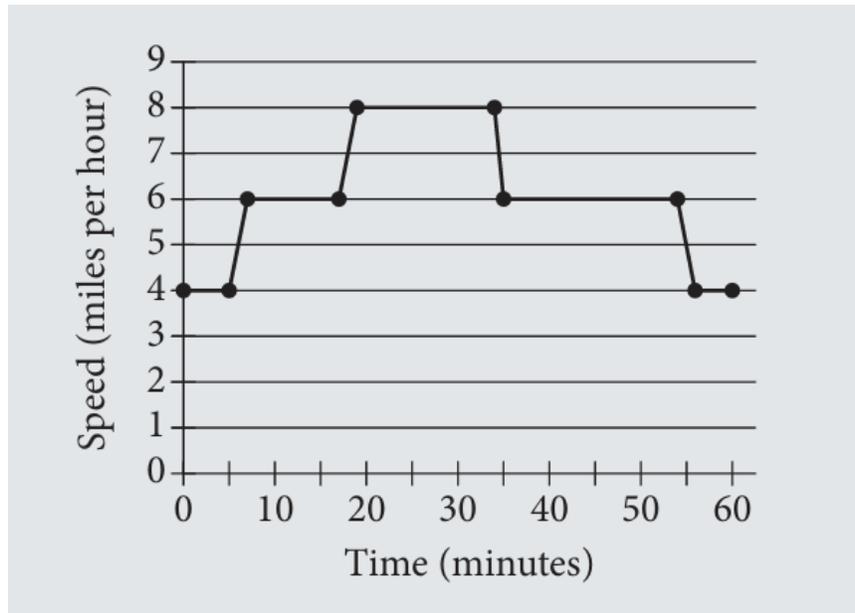
Time (hours)	Number of bacteria
0	1,000
1	4,000
2	16,000
3	64,000

7. The table above gives the initial number (at time  $t = 0$ ) of bacteria placed in a growth medium and the number of bacteria in the growth medium each hour for 3 hours. Which of the following functions best models the number of bacteria,  $N(t)$ , after  $t$  hours?

- A)  $N(t) = 4,000t$
- B)  $N(t) = 1,000 + 3,000t$
- C)  $N(t) = 1,000(4^t)$
- D)  $N(t) = 1,000(4^t)$

8. Every month, Jamal adds two new books to his library. Which of the following types of functions best models the number of books in Jamal's library as a function of time?

- A) Increasing linear
- B) Decreasing linear
- C) Increasing exponential
- D) Decreasing exponential



9. One evening, Maria walks, jogs, and runs for a total of 60 minutes. The graph above shows Maria's speed during the 60 minutes. Which segment of the graph represents the times when Maria's speed is greatest?
- A) The segment from (17,6) to (19,8)
  - B) The segment from (19,8) to (34,8)
  - C) The segment from (34,8) to (35,6)
  - D) The segment from (35,6) to (54,6)

**END VIDEO 2**

### START VIDEO 3

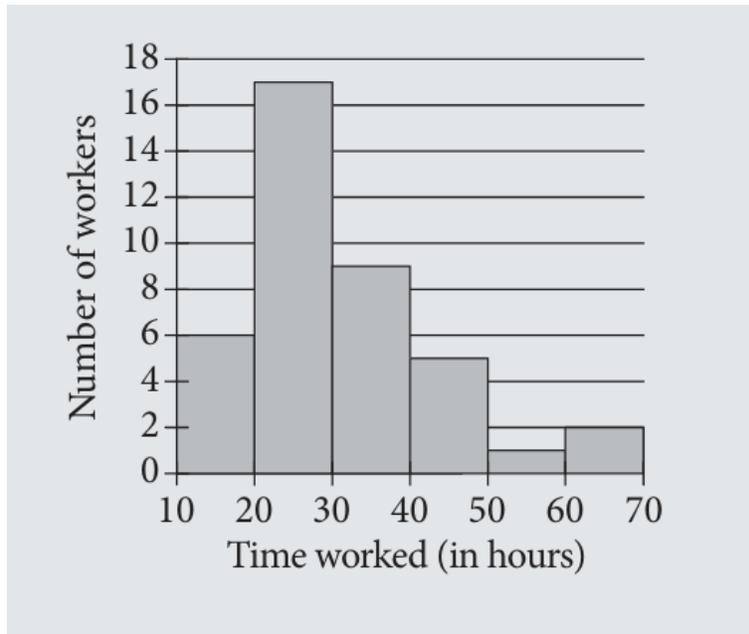
#### More Data and Statistics

10. The given table summarizes the distribution of 200 animal types by type of animal and mass, in kilograms.

	<b>Less than 45 kg</b>	<b>45 - 55 kg</b>	<b>Greater than 55 kg</b>	<b>Total</b>
<b>Cheetah</b>	12	59	4	75
<b>Leopard</b>	24	76	25	125
<b>Total</b>	36	135	29	200

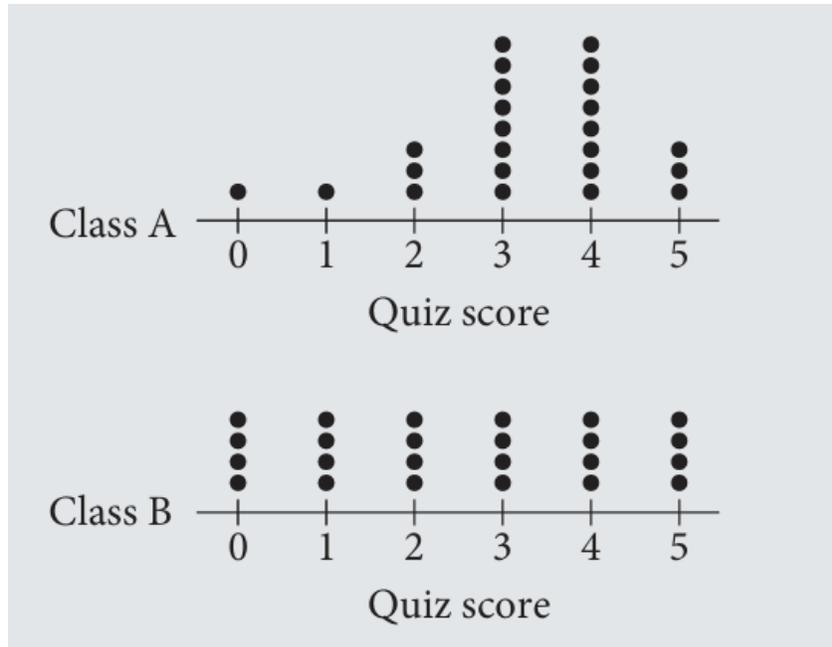
One of the animals will be selected at random. What is the probability of selecting a leopard, given that the animal's mass is greater than 55 kilograms?

- A)  $\frac{25}{29}$
- B)  $\frac{1}{5}$
- C)  $\frac{29}{200}$
- D)  $\frac{1}{8}$



11. The histogram shown summarizes the distribution of time worked last week, in hours, by the 40 employees of a landscaping company. In the histogram, the first bar represents all workers who worked at least 10 hours but less than 20 hours; the second bar represents all workers who worked at least 20 hours but less than 30 hours; and so on. Which of the following could be the median and mean amount of time worked, in hours, for the 40 employees?

- A) Median = 22, mean = 23
- B) Median = 24, mean = 22
- C) Median = 26, mean = 32
- D) Median = 32, mean = 30



12. The dot plots show the distributions of scores on a current events quiz for two classes of 24 students each. Which of the following statements about the standard deviations of the two distributions is true?
- A) The standard deviation of quiz scores in Class A is less than that of quiz scores in Class B.
  - B) The standard deviation of quiz scores in Class A is greater than that of quiz scores in Class B.
  - C) The standard deviation of quiz scores in Class A is equal to that of quiz scores in Class B.
  - D) There is not enough information to compare the standard deviations.
13. A quality control researcher at an electronics company is testing the life of the company's batteries in a certain camera. The researcher selects 100 batteries at random from the daily output of the batteries and finds that the life of the batteries has a mean of 342 pictures with an associated margin of error of 18 pictures. Which of the following is the most appropriate conclusion based on these data?
- A) All the batteries produced by the company that day have a life between 324 and 360 pictures.
  - B) All the batteries ever produced by the company have a life between 324 and 360 pictures.
  - C) It is plausible that the mean life of batteries produced by the company that day is between 324 and 360 pictures.
  - D) It is plausible that the mean life of all the batteries ever produced by the company is between 324 and 360 pictures.

14. A community center offers a Spanish course. This year, all students in the course were offered additional audio lessons they could take at home. The students who took these additional audio lessons did better in the course than students who didn't take the additional audio lessons. Based on these results, which of the following is the most appropriate conclusion?
- A) Taking additional audio lessons will cause an improvement for any student who takes any foreign language course.
  - B) Taking additional audio lessons will cause an improvement for any student who takes a Spanish course.
  - C) Taking additional audio lessons was the cause of the improvement for the students at the community center who took the Spanish course.
  - D) No conclusion about cause and effect can be made regarding students at the community center who took the additional audio lessons at home and their performance in the Spanish course.

**END VIDEO 3**

**ANSWER KEY – PROBLEM SOLVING & DATA ANALYSIS PROBLEMS**

**ANSWERS**

- |        |       |
|--------|-------|
| 1. A   | 8. A  |
| 2. D   | 9. B  |
| 3. C   | 10. A |
| 4. 320 | 11. C |
| 5. B   | 12. A |
| 6. N/A | 13. C |
| 7. D   | 14. D |

Answer explanations can be found in the [Digital SAT Study Guide](#) on pages 253 to 269.

**Summary: Problem Solving and Data Analysis Questions**

**Main Purpose:** To assess your understanding of proportional relationships, percentages, and probability as well as your ability to use data to analyze and solve problems

**Portion of the Test:** About 15 percent (5 to 7 questions)

**Question Types:**

- Ratios, rates, proportional relationships, and units
- Percentages
- One-variable data; distributions and measures of center and spread
- Two-variable data: models and scatterplots
- Probability and conditional probability
- Inference from sample statistics and margin of error
- Evaluating statistical claims: observational studies and experiments