

1  $20d + 0.7m = 235$

Shelly spent \$235 to rent a moving van. The equation above shows the relationship between the number of days she rented the van,  $d$ , and the number of miles she drove the van,  $m$ . If she rented the van for 3 days, how many miles did she drive the van?

[View Answer](#) 

- A. 118
- B. 250
- C. 307
- D. 421

Question Difficulty: Easy

2  $x = 3$   
 $y = x + 3$

---

What is the solution  $(x, y)$  to the given system of equations?

[View Answer](#) 

- A.  $(3, 6)$
- B.  $(3, 3)$
- C.  $(3, -3)$
- D.  $(3, -6)$

Question Difficulty: Easy

3  $f(x) = -0.5x + 56$

---

The given function models the average daily temperature  $f(x)$ , in degrees Fahrenheit ( $^{\circ}\text{F}$ ), in Chicago  $x$  days after November 1, for  $0 \leq x \leq 29$ . Based on this model, what is the average daily temperature, in  $^{\circ}\text{F}$ , in Chicago 6 days after November 1 ?

[View Answer](#) 

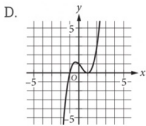
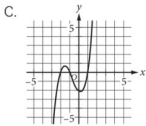
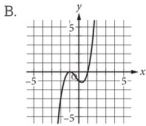
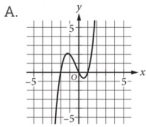
- A. 62
- B. 60
- C. 56
- D. 53

Question Difficulty: Easy

$x$	$f(x)$
4	-20
	-10
0	-2
1	0

The table gives some values of  $x$  and their corresponding values of  $f(x)$ . Which of the following graphs could be the graph of  $Y = f(x)$  in the  $xy$ -plane?

[View Answer](#) ✓



6

An automobile uses 27 pints of fuel for every 63 miles traveled. How many pints of fuel does the automobile use to travel 7 miles?

[View Answer](#) ✓

- A. 16
- B. 9
- C. 4
- D. 3

Question Difficulty: Easy

7

How many fluid ounces are equivalent to 40 cups of liquid? (8 fluid ounces = 1

[View Answer](#) ✓

- A. 0.2
- B. 5.0
- C. 48.0
- D. 320.0

Question Difficulty: Easy

5

What percentage of 40 is 15 ?

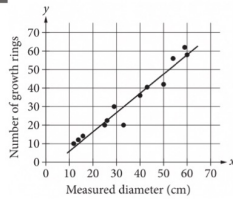
[View Answer](#) ✓

- A. 62.5%
- B. 37.5%
- C. 32.5%
- D. 2.70%

Question Difficulty: Easy

Questions 8 and 9 refer to the following information.

8



For a sample of 13 red alder trees, an arborist measured each tree's diameter, in centimeters (cm), at a height of 1.4 meters. The arborist then counted the number of growth rings at this height. Each point in the scatterplot represents the diameter and number of rings for each tree. A line of best fit for these data is also shown.

A red alder tree will be selected at random from the sample. What is the probability that the selected tree will have a measured diameter that is greater than 30 cm?

[View Answer](#) ✓

- A.  $\frac{1}{7}$
- B.  $\frac{6}{13}$
- C.  $\frac{7}{13}$
- D.  $\frac{6}{7}$

Question Difficulty: Easy

9

For how many of the trees in the sample is the number of growth rings greater than the number predicted by the line of best fit?

[View Answer](#) ✓

- A. 3
- B. 4
- C. 6
- D. 10

Question Difficulty: Easy

10

The volume of a neodymium magnet is 2.50 cubic centimeters, and its mass is 18.5 grams. What is the density, in grams per cubic centimeter, of the magnet?

[View Answer](#) 

- A. 0.140
- B. 7.40
- C. 16.0
- D. 46.3

**Question Difficulty:** Easy

11

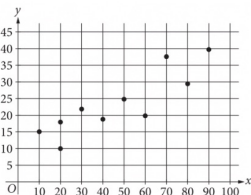
0, 2, 3, 4, 5, 5, 5, 6, 6, 7

The given list shows a baseball team's score for each of its first 10 games. In the eleventh game, the team had a score of 18. Which of the following best describes the mean and median of the team's scores for the first 11 games compared to the first 10 games?

[View Answer](#) 

- A. The mean increased and the median remained unchanged.
- B. The median increased and the mean remained unchanged.
- C. Both the mean and the median remained unchanged.
- D. Both the mean and the median increased.

12



The scatterplot shows 10 values from a data set. Which of the following equations is the most appropriate linear model for the data shown?

[View Answer](#) 

- A.  $y = 9 + \frac{3}{10}x$
- B.  $y = 9 - \frac{3}{10}x$
- C.  $y = \frac{6}{5}x$
- D.  $y = \frac{3}{8}x$

**Question Difficulty:** Medium

13

Triangles ABC and DEF each have a corresponding angle measuring  $40^\circ$ . Which additional piece of information is sufficient to determine whether these two triangles are similar?

[View Answer](#) 

- A. The length of line segment AC
- B. The length of line segment DE
- C. The measure of another pair of corresponding angles in the two triangles
- D. The lengths of one pair of corresponding sides in the two triangles

**Question Difficulty:** Medium

14

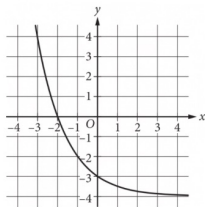
If  $3\left(\frac{x}{5} + \frac{1}{2}\right) + 1 = 10$ , what is the value of  $\frac{x}{5} + \frac{1}{2}$ ?

[View Answer](#) 

- A. 1
- B. 3
- C. 6
- D. 12

**Question Difficulty:** Medium

15



The graph of the exponential function  $f$  is shown. For what value of  $x$  is  $f(x) = 0$ ?

[View Answer](#) 

- A. -4
- B. -3
- C. -2
- D. -1

**Question Difficulty:** Medium

- 16 The half-life of the radioactive isotope iodine-131 is approximately 8 days, which means that at the end of each 8-day time interval only half of the mass of the isotope that was present at the beginning of the time interval remains. Which of the following best describes how the amount of iodine-131 changes over time?

[View Answer](#) ✓

- A. It increases linearly.
- B. It decreases linearly.
- C. It increases exponentially.
- D. It decreases exponentially.

**Question Difficulty:** Medium

- 17 In the  $xy$ -plane, a circle with radius 2 has center  $(0,0)$ . Which of the following is a equation of the circle?

[View Answer](#) ✓

- A.  $x^2 + y^2 = 2$
- B.  $x^2 + y^2 = 4$
- C.  $x^2 - y^2 = 2$
- D.  $x^2 - y^2 = 4$

**Question Difficulty:** Medium

18  $x^2 + 2x - 3 = 0$

---

If  $x$  satisfies the given equation, which of the following could be a value of  $x + 3$ ?

[View Answer](#) ✓

- A.  $-4$
- B.  $-2$
- C.  $0$
- D.  $2$

**Question Difficulty:** Medium

## 19 Phone Survey

Age group (in years)	Agree	Disagree	Total
18–29	113	109	222
30–44	126	136	262
45–64	145	201	346
65 and up	68	102	170
Total	452	548	1,000

The table shows the results of a poll of 1,000 people. Respondents were asked to agree or disagree with the statement “I rely too much on my phone.” If a respondent who was selected at random disagrees with the statement, which of the following is closest to the probability that the respondent selected is at least 45 years old?

[View Answer](#) 

- A. 0.37
- B. 0.45
- C. 0.49
- D. 0.55

Question Difficulty: Medium

20	$x$	-1	0	1	2
	$y$	$-2k$	$-20$	$2k$	$24k + 4$

The table above shows several values of  $x$  and their corresponding values of  $y$ , where  $k$  is a nonzero constant. If the relationship between  $x$  and  $y$  is linear, which of the following defines this relationship?

[View Answer](#) 

- A.  $y = 2x(k + 1)$
- B.  $y = kx$
- C.  $y = -2kx$
- D.  $y = -2k - x - 1$

Question Difficulty: Medium

21

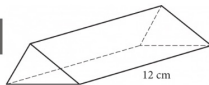
Object A has a mass of  $x$  kilograms (kg). Object B has a mass of  $1.1x$  kg. What is the ratio of the mass of object A to the mass of object B?

[View Answer](#) ▾

- A. 1 to 1
- B. 1 to 11
- C. 10 to 1
- D. 10 to 11

**Question Difficulty:** Medium

22



The volume of the right triangular prism shown is 96 cubic centimeters ( $\text{cm}^3$ ). What is the area, in  $\text{cm}^2$ , of one of the triangular bases of the prism?

[View Answer](#) ▾

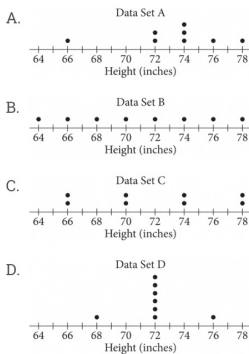
- A. 4
- B. 8
- C. 16
- D. 42

**Question Difficulty:** Medium

23

The dot plots show the distribution of heights, in inches, of members from four basketball teams. Of the data sets summarized by the dot plots, which has the smallest standard deviation?

[View Answer](#) ▾



**Question Difficulty:** Medium



24

Sanjay works as a teacher's assistant for \$20 per hour and tutors privately for \$25 per hour. Last week, he made at least \$100 working  $x$  hours as a teacher's assistant and  $y$  hours as a private tutor. Which of the following inequalities models this situation?

[View Answer](#) 

- A.  $4x + 5y \geq 25$
- B.  $4x + 5y \geq 20$
- C.  $5x + 4y \geq 25$
- D.  $5x + 4y \geq 20$

**Question Difficulty:** Medium

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25

The total cost  $C$ , in dollars, to tile a square floor is represented by the equation  $C = 16L^2$ , where  $L$  is the length of one side of the floor, in feet. Which of the following represents the cost, in dollars per square foot, to tile the floor?

[View Answer](#) 

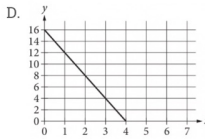
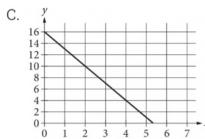
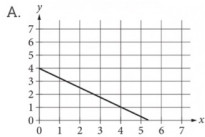
- A.  $L$
- B.  $4$
- C.  $16$
- D.  $16L$

**Question Difficulty:** Medium

$$3x + 4y = 16$$

The given equation models the number of 3-credit-hour courses,  $x$ , and the number of 4-credit-hour courses,  $y$ , that Camila can take for a total of 16 credit hours next semester. Which graph models this relationship?

[View Answer](#) ▾



Question Difficulty: Medium

27

The interstate route from Los Angeles, California, to Jacksonville, Florida, cost about \$5 billion total to build and has a total distance of about 2,500 miles. Each mile of the interstate route cost about \$2 million to build. If the linear relationship between the distance  $x$ , in thousands of miles, and the cost  $y$ , in billions of dollars, is represented in the  $xy$ -plane, what is the  $y$ -intercept of the graph?

[View Answer](#) ▾

- A.  $(0,0)$
- B.  $(0,200,000)$
- C.  $(200,000,0)$
- D.  $(200,000,200,00)$

Question Difficulty: Hard

Questions 28 and 29 refer to the following information.

28

The populations, in thousands, of Alaska and Hawaii from 1960 to 2015 can be modeled by the functions  $A$  and  $H$ , where  $x$  is the number of years since January 1, 1960, and  $0 \leq x \leq 55$ .

Alaska:  $A(x) = 221 + 9.78x$

Hawaii:  $H(x) = 645 + 14.5x$

---

Based on the model, what is the predicted population of Alaska on January 1, 1960?

[View Answer](#) 

- A. 9.78
- B. 221
- C. 9,780
- D. 221,000

Question Difficulty: Hard

Questions 28 and 29 refer to the following information.

29

The populations, in thousands, of Alaska and Hawaii from 1960 to 2015 can be modeled by the functions  $A$  and  $H$ , where  $x$  is the number of years since January 1, 1960, and  $0 \leq x \leq 55$ .

Alaska:  $A(x) = 221 + 9.78x$

Hawaii:  $H(x) = 645 + 14.5x$

---

Based on the model, in which year does the predicted population of Hawaii first exceed 900,000 ?

[View Answer](#) 

- A. 1966
- B. 1967
- C. 1976
- D. 1977

Question Difficulty: Medium

30

A psychologist conducting a memory experiment provided participants with a list of three-letter sequences. Immediately after the experiment, the participants remembered 100% of the sequences. The psychologist found that the percentage of sequences the participants remembered decreased by 30% for every 3-second interval that passed. Which function best models this situation, where  $P$  is the percentage of sequences the participants remembered, and  $t$  is the time, in seconds, that passed?

[View Answer](#) ✓

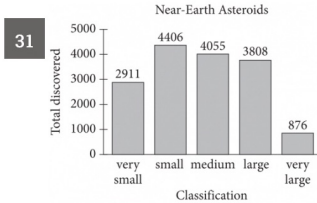
A.  $P(t) = 100(0.30)^{3t}$

B.  $P(t) = 100(0.30)^t$

C.  $P(t) = 100(0.70)^{\frac{t}{3}}$

D.  $P(t) = 100(0.70)^t$

Question Difficulty: Hard



The bar graph shows the number of discovered near-Earth asteroids, by classification, as of April 2017. Of the near-Earth asteroids, how many more are classified as medium, large, or very large than are classified as very small or small?

[View Answer](#) ✓

Question Difficulty: Easy

32  $x^2 - 4x - 9 = 0$

The solutions to the given equation can be written in the form  $\frac{m \pm \sqrt{k}}{2}$ , where  $m$  and  $k$  are integers. What is the value of  $m + k$  ?

[View Answer](#) ✓

Question Difficulty: Hard

33

What is the result of increasing 300 by 200%?

[View Answer](#) ✓

Question Difficulty: Hard

$$34 \quad y = \frac{3}{2}x - \frac{1}{2}$$

$$y = \frac{k}{3}x + \frac{1}{3}$$

---

In the system of equations above,  $k$  is a constant. If the system has no solutions, what is the value of  $k$  ?

[View Answer](#) ✓

Question Difficulty: Hard

35

The expression  $0.6y$  represents the result of decreasing the quantity  $y$  by  $p\%$ . What is the value of  $p$  ?

[View Answer](#) ✓

Question Difficulty: Hard

36

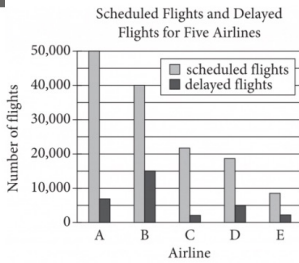
Two numbers,  $a$  and  $b$ , are each greater than zero, and the square root of  $a$  is equal to the cube root of  $b$ . For what value of  $x$  is  $a^{2x-1}$  equal to  $b$  ?

[View Answer](#) ✓

Question Difficulty: Hard

Questions 37 and 38 refer to the following information.

37



The bar graph above shows the total number of scheduled flights and the number of delayed flights for five airlines in a one-month period. Values have been rounded to the nearest 1000 flights.

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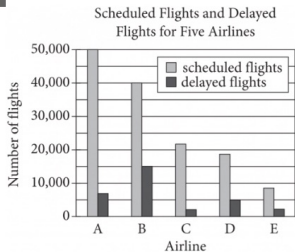
According to the graph, what is the median number of delayed flights for the airlines shown?

[View Answer](#) ✓

Question Difficulty: Medium

Questions 37 and 38 refer to the following information.

38



The bar graph above shows the total number of scheduled flights and the number of delayed flights for five airlines in a one-month period. Values have been rounded to the nearest 1000 flights.

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According to the graph, for the airline with the greatest number of delayed flights, what fraction of the total number of scheduled flights for the airline were delayed?

[View Answer](#) ✓

Question Difficulty: Medium