10

Washington High School randomly selected freshman, sophomore, junior, and senior students for a survey about potential changes to next year's schedule. Of students selected for the survey, $\frac{1}{4}$ were freshmen and $\frac{1}{3}$ were sophomores. Half of the remaining selected students were juniors. If 336 students were selected for the survey, how many were seniors?

A) 240
B) 140
C) 120
D) 70

11

Plant A is currently 20 centimeters tall, and Plant B is currently 12 centimeters tall. The ratio of the heights of Plant A to Plant B is equal to the ratio of the heights of Plant C to Plant D. If Plant C is 54 centimeters tall, what is the height of Plant D, in centimeters?

A) 32.4
B) 44.0
C) 62.0
D) 90.0

12

Biologists found a new species of pale shrimp at the world's deepest undersea vent, the Beebe Vent Field. The vent is 3.1 miles below the sea's surface. Approximately how many kilometers below the sea's surface is the vent? (1 kilometer ≈ 0.6214 miles)

A) 2
B) 3
C) 4
D) 5

13

A cargo helicopter delivers only 100-pound packages and 120-pound packages. For each delivery trip, the helicopter must carry at least 10 packages, and the total weight of the packages can be at most 1,100 pounds. What is the maximum number of 120-pound packages that the helicopter can carry per trip?

A) 2
B) 4
C) 5
D) 6

CONTINUE

14

A company purchased a machine valued at $120,000. The value of the machine depreciates by the same amount each year so that after 10 years the value will be $30,000. Which of the following equations gives the value, v, of the machine, in dollars, t years after it was purchased for $0 \le t \le 10$?

A) $v = 30{,}000 - 9{,}000t$

B) $v = 120,000 - 9,000t$

C) $v = 120{,}000 + 9{,}000t$

D) $v = 120{,}000 - 30{,}000t$

15

Line m in the xy-plane contains the points $(2, 4)$ and $(0, 1)$. Which of the following is an equation of line m ?

A) $y = 2x + 3$

B) $y = 2x + 4$

C) $y = \frac{3}{2}x + 3$

D) $y = \frac{3}{2}x + 1$

16

$$(4x + 4)(ax - 1) - x^2 + 4$$

In the expression above, a is a constant. If the expression is equivalent to bx, where b is a constant, what is the value of b ?

A) -5

B) -3

C) 0

D) 12

17

If $2w + 4t = 14$ and $4w + 5t = 25$, what is the value of $2w + 3t$?

A) 6

B) 10

C) 13

D) 17

CONTINUE

21

The graph of the exponential function h in the xy-plane, where $y = h(x)$, has a y-intercept of d, where d is a positive constant. Which of the following could define the function h ?

A) $h(x) = -3(d)^x$

B) $h(x) = 3(x)\,d$

C) $h(x) = d(-x)^3$

D) $h(x) = d(3)^x$

22

The weights, in pounds, for 15 horses in a stable were reported, and the mean, median, range, and standard deviation for the data were found. The horse with the lowest reported weight was found to actually weigh 10 pounds less than its reported weight. What value remains unchanged if the four values are reported using the corrected weight?

A) Mean

B) Median

C) Range

D) Standard deviation

23

Near the end of a US cable news show, the host invited viewers to respond to a poll on the show's website that asked, "Do you support the new federal policy discussed during the show?" At the end of the show, the host reported that 28% responded "Yes," and 70% responded "No." Which of the following best explains why the results are unlikely to represent the sentiments of the population of the United States?

A) The percentages do not add up to 100%, so any possible conclusions from the poll are invalid.

B) Those who responded to the poll were not a random sample of the population of the United States.

C) There were not 50% "Yes" responses and 50% "No" responses.

D) The show did not allow viewers enough time to respond to the poll.

24

If $f(x) = 5x^2 - 3$ and $f(x + a) = 5x^2 + 30x + 42$, what is the value of a ?

A) -30

B) -3

C) 3

D) 30

CONTINUE