## End-of-Course Test

**Select the best answer.**

1. Which situation is best modeled by the expression $2 + x$?
   - A Tabitha lost 2 out of her $x$ marbles under the couch.
   - B Sudhir had $2 and spent $x$ dollars on a hamburger.
   - C Fatima is 2 years older than her sister Delilah who is $x$ years old.
   - D Dominic ran the $x$ mile course 2 times.

2. Solve $8x - (2x + 3) = 4x + 1$.
   - F $\frac{1}{3}$
   - H 2
   - G $-1$
   - J 4

3. Which expression represents the perimeter of the triangle below?

   ![Triangle Diagram]

   - A $3 + 4m$
   - B $3 + 6m$
   - C $5 + 4m$
   - D $5 + 6m$

4. If $x = -1$, which quadrant does the point $(2x, -x)$ lie in?
   - F Quadrant I
   - G Quadrant II
   - H Quadrant III
   - J Quadrant IV

5. The time it takes Jarvis to get to school on his bike is $\frac{1}{3}$ of the time it takes to walk. Which equation can be solved to find the time it takes Jarvis to walk to school if he can bike there in 5 minutes?
   - A $3w = 5$
   - B $w = \frac{1}{3} \times 5$
   - C $\frac{1}{3}w = 5$
   - D $w - \frac{1}{3} = 5$

6. Solve $-\frac{x}{7} - \frac{2}{3} = \frac{4}{21}$.
   - F $-6$
   - H $1 \frac{1}{3}$
   - G $-1 \frac{1}{3}$
   - J 6

7. Approximately 9 out of 100 people are left handed. Out of a population of 1740 people, how many are likely to be left handed?
   - A 139
   - B 157
   - C 174
   - D 193

8. The points $\{-2, 1\}, \{0, 3\}, \{1, 2\}$ are on the graph of function $f$. What are the coordinates of these three points after a vertical stretch by a factor of 2?
   - F $\{-4, 1\}, \{0, 3\}, \{2, 2\}$
   - G $\left\{-2, \frac{1}{2}\right\}, \left\{0, \frac{3}{2}\right\}, \left\{1, 1\right\}$
   - H $\left\{-1, 1\right\}, \left\{0, 3\right\}, \left\{\frac{1}{2}, 2\right\}$
   - J $\{-2, 2\}, \{0, 6\}, \{1, 4\}$

9. Which is NOT a solution to the inequality $4x - 7 < 5$?
   - A $-2$
   - B 0
   - C 1
   - D 3

10. Lorena and Sebastian are both five years old. Every year they each get a cash present from their neighbor. Sebastian gets $1.50 for every year in his age, and Lorena gets $20. How old will they be when Sebastian gets more money than Lorena?
    - F 9
    - G 13
    - H 14
    - J 20

11. Which of these describes the transformation in terms of $f(x)$?
    - A $f(x) - 6$
    - B $-6f(x)$
    - C $f(x + 6)$
    - D $f(x - 6)$

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continued

12. Which of the following statements is true?
   F The dependent variable is the input of the function.
   G The dependent variable determines the domain of the function.
   H In $f(x) = 2x + 1$, $x$ is the dependent variable.
   J In $f(x) = 2x + 1$, $f(x)$ is the dependent variable.

13. Which function has (0, 7) on its graph?
   A $-3x + y = 7$  C $y = 14 - x$
   B $y = x - 7$  D $-7x + y = 2$

14. Which situation best fits the graph below and what type of correlation is it?

   F distance traveled vs. cost of gas; negative correlation
   G distance traveled vs. cost of gas; positive correlation
   H time traveled vs. distance from destination; negative correlation
   J time traveled vs. distance from destination; positive correlation

15. A function has $x$-intercept 3 and $y$-intercept 2. Which of the functions below could be this function?
   A $4 + 3x = 2y$
   B $2x - 3y = -6$
   C $2y + 3x = 4$
   D $3y - 6 = -2x$

16. The scoring for a football game by quarters was recorded as the ordered pairs \((1, 7), (2, 10), (3, 21), (4, 21)\). Which of the following statements is true?
   F The relation is a function with domain \(\{1, 2, 3, 4\}\).
   H The relation is a function with domain \(\{7, 10, 21\}\).
   G The relation is a not a function.
   J The relation is a function with domain \(\{1 \leq x \leq 4\}\).

17. Which equation describes a line that passes through \((7, 1)\) and is perpendicular to the line described by $y = -\frac{1}{2}x + 3$?
   A $y = 2x - 13$  C $y = 2x - 6$
   B $y = 2x - 7$  D $y = 2x + 3$

18. The change from $f(x) = 4x + 2$ to $g(x) = 3x + 2$ is an example of which type of transformation?
   F rotation  H translation up
   G reflection  J translation down

19. A local video store has two new renting plans. Plan A charges a $10 monthly fee and $2 for every movie rented. Plan B charges $40 per month but then each movie rented is only 25¢. How many movies must be rented in a month to make plan B the cheaper option?
   A 17  C 28
   B 18  D 29

20. Classify the system $\begin{cases} y = 2x + 3 \\ y = -2x + 3 \end{cases}$
   F inconsistent  G consistent and independent
   H inconsistent and dependent  J consistent and dependent

21. Which point is a solution of $\begin{cases} y - 3x \geq 2 \\ y \leq x + 9 \end{cases}$?
   A $(-2, 8)$  C $(4, -1)$
   B $(-1, 4)$  D $(8, -2)$
22. Which of the following pairs of points is the solution to the system of equations below?
\[
\begin{align*}
y &= x^2 - 1 \\
y &= -x + 5
\end{align*}
\]
F (2, 3), (4, 15)  
H (-3, 8), (2, 3)  
G (-3, 8), (1, 4)  
J (1, -1), (1, 4)

23. Which of the following is NOT equivalent to \( \frac{x^2 - 1}{4x^3} \)?

- A \( \frac{y}{4x^3} \)^{-2}  
- B \( \frac{4x^3}{y} \)^{-2}  
- C \( \frac{16x^5}{y^2} \)  
- D \( \frac{4x^5}{x^2y} \)^{-2}

24. Describe the transformation of the graph from \( f(x) = 10x + 16 \) to \( g(x) = 10x + 11 \).
F g(x) is less steep.  
G g(x) is steeper.  
H g(x) is translated 5 units down.  
J g(x) is translated 5 units up.

25. A figure in the coordinate plane is reflected across the line \( y = x + 2 \) and then across the line \( y = x + 4 \). What is the translation vector that describes the composition of the reflections?
A \( \langle -2, 2 \rangle \)  
B \( \langle 0, 4 \rangle \)  
C \( \langle 4, 0 \rangle \)  
D \( \langle 2, 2 \rangle \)

26. Which graph has the y-axis as a line of symmetry?
F \( f(x) = x^2 + 3 \)  
G \( f(x) = (x + 2)^2 \)  
H \( f(x) = |x + 1| \)  
J \( f(x) = x^3 \)

27. Which pair of regular polygons CANNOT be used to make a semiregular tessellation?
A octagon and square  
B hexagon and triangle  
C hexagon and square  
D square and triangle

28. Which of the following statements does NOT apply to the quadratic function \( f(x) = -x^2 + 7 \)?
F The vertex is at \( (0, 7) \).  
G The parabola opens downward.  
H Its axis of symmetry is \( y = 0 \).  
J There are two x-intercepts.

29. Michele is hiking and notices that some of the mountains resemble parabolas. If the following functions describe shapes of mountains, which of the following mountains would have the steepest slope?
A Mountain A: \( y = -\frac{3}{2}x^2 + 5 \)  
B Mountain B: \( y = -x^2 + 5 \)  
C Mountain C: \( y = -\frac{1}{2}x^2 + 5 \)  
D Mountain D: \( y = -\frac{1}{5}x^2 + 5 \)

30. Solve \( x^2 + 10x = 39 \) by completing the square.
F \( x = -5 \pm \sqrt{14} \)  
G \( x = -3 \text{ or } 13 \)  
H \( x = 3 \text{ or } -13 \)  
J \( x = 5 \pm \sqrt{14} \)
End-of-Course Test
continued

31. Ava’s class was surveyed to help figure out what color their school banner should be. If a total of 28 students were surveyed, how many chose green?

**School Banner**

- Yellow
- Orange
- Red
- Green
- Blue

- A 4 students
- B 6 students
- C 7 students
- D 10 students

32. Which of the following pieces of information can be obtained from a box-and-whisker plot?

- F the mean of the data set
- G the number of values in the data set
- H the median of the data set
- J the mode of the data set

33. Ivan has 7 tickets to a concert and 2 of the tickets have backstage passes. If Ivan passes out the tickets randomly to 7 friends, what are the odds against his friend Jada getting a backstage pass?

- A 2:5
- B 2:7
- C 5:2
- D 5:7

34. The table shows the number of customers at an ice cream shop and the number of sundaes sold. Which is the best line of fit for the data?

<table>
<thead>
<tr>
<th>Customers</th>
<th>10</th>
<th>12</th>
<th>20</th>
<th>24</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sundaes</td>
<td>60</td>
<td>70</td>
<td>118</td>
<td>148</td>
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</tbody>
</table>

- F $y \approx 6.24x - 4.0$
- G $y \approx 6.0x - 1.3$
- H $y \approx 6.82x - 11.0$
- J $y \approx 4.0x - 48.7$

35. What is the 5th term in the geometric sequence 96, 72, 54, ...?

- A 30
- B $30 \frac{3}{8}$
- C 36
- D $40 \frac{1}{2}$

36. Which two quadrants is the function $f(x) = 2(4)^x$ graphed in?

- F Quadrants I and II
- G Quadrants II and III
- H Quadrants III and IV
- J Quadrants I and IV

37. Which function has the higher rate of change over the interval $[0, 3]$?

- A $y = 2x + 4$
- B $y = -x - 3$
- C $y = 2x^2 - 1$
- D $y = 2(3)^x$

38. Which is the more precise measurement?

- F 84.2 km
- G 84 cm
- H 842 mm
- J 0.8 m

39. What is the $x$-value for the solution to the system of equations below?

\[
\begin{align*}
2x + y &= 8 \\
-4x - y &= -14
\end{align*}
\]

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

40. A research biologist starts with 100 bacteria and watches it double in number each day. Which equation will give the number of bacteria as a function of $x$, the number of days?

- F $y = 2^x$
- G $y = 100^x$
- H $y = 2(100)^x$
- J $y = 100(2)^x$

41. Which is an $x$-intercept of the graph of $y = x^2 + x - 12$?

- A 1
- B -4
- C -3
- D 4
## Answers

### End-of-Course Test

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