DIRECTIONS
Read and solve each question. For this test you may assume that the value of a denominator is not zero.

SAMPLE
Which is equivalent to $\frac{b^6}{b^2}$?

A $\frac{1}{b^3}$
B $b^3$
C $b^4$
D $b^8$

1 Which property of real numbers is utilized by rewriting $11x + 5xy$ as $x(11 + 5y)$?

A Associative property for addition
B Commutative property for addition
C Closure property for multiplication
D Distributive property for multiplication over addition

2 What is the solution to $2 - 4a = 16$?

F 18
G 10
H $\frac{-7}{2}$
J $\frac{-9}{2}$

3 The volume of a cylinder is given by $V = \pi r^2h$

where $r$ is the radius of the cylinder and $h$ is the cylinder's height. Which equation could be used to solve for $h$?

A $h = \frac{V}{\pi r^2}$
B $h = \frac{V}{\pi r^2}$
C $h = V + \pi r^2$
D $h = V - \pi r^2$

4 Tambria’s property has the shape of a trapezoid with the dimensions shown. If the perimeter of the property is 3,279 feet, what is the value of $x$?

F 726 ft
G 781.25 ft
H 913.5 ft
J 1,452 ft
5 Which graph best represents the function \( y = \frac{-4}{3}x + 2? \)

6 What is the solution to the inequality \( 7x - 5 \geq x + 1? \)

- F \( x \leq 1 \)
- G \( x \geq 1 \)
- H \( x \geq -1 \)
- J \( x \leq \frac{5}{2} \)

7 Which line has a negative slope?

- A \( A \)
- B \( B \)
- C \( C \)
- D \( D \)
8 Which line most likely has a slope of \(\frac{1}{2}\) and y-intercept 3?

9 What is the slope of the graph of 
\[ y = 6x - 1 \]?

- A \(-6\)
- B \(-1\)
- C \(\frac{1}{6}\)
- D 6

10 What is the slope of the line that goes through 
\((-3, 2)\) and \((3, 2)\)?

- F Undefined
- G 0
- H \(\frac{2}{3}\)
- J \(\frac{3}{2}\)
11 Which equation fits the data in the table?

<table>
<thead>
<tr>
<th>x</th>
<th>-2</th>
<th>0</th>
<th>2</th>
<th>4</th>
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<tbody>
<tr>
<td>y</td>
<td>3</td>
<td>2</td>
<td>1</td>
<td>0</td>
</tr>
</tbody>
</table>

A) $y = -\frac{x}{2} + 2$

B) $y = x + 3$

C) $y = 2x - 3$

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

12 Roy works at the local grocery store and is paid $6.00 per hour. The graph shown describes his salary, S, based on the number of hours, t, he works.

Which is an equation of the graph shown?

F) $S = 6 + t$

G) $S = 6t$

H) $S = \frac{6}{t}$

J) $S = \frac{t}{6}$
13 The equation of the line that contains the points (−8, 1) and (0, −5) is —

A $y = \frac{3}{4}x + 7$

B $y = \frac{1}{2}x + 1$

C $y = -\frac{3}{4}x - 5$

D $y = -\frac{3}{4}x + 7$

14 \[ \begin{align*}
  x + y &= 4 \\
  x - y &= 2
\end{align*} \]
Which is the solution to the system of equations shown?

F $x = 1, y = 3$

G $x = 2, y = 2$

H $x = 3, y = 1$

J $x = 4, y = 0$

15 A rectangle has a perimeter of 68 inches. Its length is 2 inches less than 3 times its width. What are the length and width of the rectangle?

A Length = 22 in., width = 12 in.

B Length = 25 in., width = 9 in.

C Length = 28 in., width = 10 in.

D Length = 22 in., width = 8 in.

16 This is a graph of a system of equations.

Which is most likely the solution to the system of equations shown?

F (0, 5)

G (1, 0)

H (3, −2)

J (−2, 3)

17 $2x^2 - 3x + 1 = 0$
Which is the solution set for the equation above?

A {−2, −1}

B \[ \{ -1, \frac{-1}{2} \} \]

C \[ \{ \frac{1}{2}, 1 \} \]

D {1, 2}
18 \[ x^2 - 4 = 0 \]

Which is the solution set for the equation above?

F \([-4, 1]\)
G \([-2, 2]\)
H \([-1, 4]\)
J \([0, 4]\)

19 What is the value of \(3x^2 - y^2\) if \(x = -1\) and \(y = 3\)?

A 12
B -3
C -6
D -12

20 Which expression correctly represents $10$ less than twice the cost, \(c\)?

F \(10 - 2c\)
G \(10 - 2 + c\)
H \(2c - 10\)
J \(\frac{c}{2} - 10\)

21 Which is equivalent to \(\frac{x^5y^2z^8}{(xy)^3}\)?

A \(\frac{x^2z^8}{y}\)
B \(x^{12}y^8z^8\)
C \(\frac{-x^4yz^8}{3}\)
D \(x^8y^5z^8\)

22 Consider the following models.

\[\quad = x^2 \quad \quad = x \quad \quad = 1\]
\[\quad = -x^2 \quad \quad = -x \quad \quad = -1\]

What polynomial is represented by the following?

F \(3x^2 - x - 5\)
G \(3x^2 - 7x - 5\)
H \(3x^2 + 7x - 5\)
J \(3x^2 + x - 5\)

23 Consider the following models.

\[\quad = x^2 \quad \quad = x \quad \quad = 1\]

Which expression represents the area of the diagram below?

\[x + 4\]
\[x + 1\]

A \(x^2 + 5x + 4\)
B \(2x + 5\)
C \(4x + 10\)
D \(x^2 + 4\)
24 The continent of North America has an area of approximately $9.4 \times 10^6$ square miles. The area of Asia is approximately $1.74 \times 10^7$ square miles. How many square miles larger is Asia than North America?

F $7.6 \times 10^1$
G $7.6 \times 10^1$
H $8.0 \times 10^6$
J $8.0 \times 10^1$

25 Which expression is equivalent to $(9x + 1)(9x - 1)$?

A $10x$
B $81x^2 - 1$
C $18x^2 - 1$
D $81x^2 - 18x - 1$

26 What is one of the factors of $x^2 - 2x - 15$?

F $(x - 3)$
G $(x - 5)$
H $(x + 1)$
J $(x + 15)$

27 When completely factored, $4 - 16x + 28y$ equals —

A $4(1 - 4x + 7y)$
B $4(1 - 4x + 28y)$
C $(4 - 7y)(1 + 4x)$
D $4 - 4(4x - 7y)$

28 The area of a rectangle is represented by the expression $2x^3 + 5x + 2$.

Which is an equivalent expression for this area?

F $(2x + 2)(x + 1)$
G $(2x + 3)(x + 2)$
H $(2x + 1)(x + 4)$
J $(2x + 1)(x + 2)$

29 Which is closest to the value of $x$ if $x = 2.7$?

A 3.2
B 3.7
C 5.3
D 9.9

30 What is the value of $\sqrt{3.2} / 2$ to the nearest tenth?

F 0.7
G 0.9
H 1.3
J 1.5
31. The numbers in this table follow a linear pattern.

<table>
<thead>
<tr>
<th>p</th>
<th>w</th>
</tr>
</thead>
<tbody>
<tr>
<td>-3</td>
<td>14</td>
</tr>
<tr>
<td>-2</td>
<td>11</td>
</tr>
<tr>
<td>-1</td>
<td>?</td>
</tr>
<tr>
<td>0</td>
<td>5</td>
</tr>
<tr>
<td>1</td>
<td>2</td>
</tr>
<tr>
<td>2</td>
<td>-1</td>
</tr>
</tbody>
</table>

What is the missing value?

A 7
B 8
C 9
D 10

32. Which of these data sets represents a function?

A

B

C

D

33. Loki said the following graph does not represent a function of x.

Which pair of points could Loki use to prove that her statement is correct?

A  \((-3, 4)\) and \((-3, -4)\)
B \((-4, 3)\) and \((4, 3)\)
C \((-3, 4)\) and \((4, -3)\)
D \((-5, 0)\) and \((5, 0)\)
What is the apparent range of the function of \( x \) shown?

\[ \text{F} \quad \text{The set of all real numbers greater than or equal to 4} \\
\text{G} \quad \text{The set of all real numbers greater than or equal to 1} \\
\text{H} \quad \text{The set of all real numbers less than or equal to 1} \\
\text{J} \quad \text{The set of all real numbers} \]

If \( f(x) = -2x + 3 \), what is \( f(-4) \)?

\[ \text{F} \quad -5 \\
\text{G} \quad -1 \\
\text{H} \quad 5.5 \\
\text{J} \quad 11 \]

The chart shows how the wholesale price of an item, \( p \), depends on the cost of the materials needed to produce the item, \( m \). Which equation represents this linear relationship?

<table>
<thead>
<tr>
<th>( m )</th>
<th>$0.50</th>
<th>$1.00</th>
<th>$1.50</th>
<th>$2.00</th>
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</thead>
<tbody>
<tr>
<td>( p )</td>
<td>$4.00</td>
<td>$5.00</td>
<td>$6.00</td>
<td>$7.00</td>
</tr>
</tbody>
</table>

\[ \text{A} \quad p = m + 3.5 \\
\text{B} \quad p = 2m + 3 \\
\text{C} \quad p = 3m + 2.5 \\
\text{D} \quad p = 4m + 2 \]

What is the range of the function \( f(x) = 3x - 1 \) when the domain is \([-1, 0, 1]\)?

\[ \text{F} \quad \{-1, 2\} \\
\text{G} \quad \{-1, 0, 1\} \\
\text{H} \quad \{1, 2, 4\} \\
\text{J} \quad \{-4, -1, 2\} \]
39 Which of the following does not represent a function of \( x \)?

A

\[
\begin{array}{c|cccc}
 x & 1 & 1 & 1 & 1 \\
 y & 1 & 2 & 3 & 4 \\
\end{array}
\]

B

\[
\begin{array}{c|cccc}
 x & 1 & 2 & 3 & 4 \\
 y & 1 & 1 & 1 & 1 \\
\end{array}
\]

C

\[
\begin{array}{c|cccc}
 x & 1 & 2 & 3 & 4 \\
 y & 2 & 2 & 4 & 5 \\
\end{array}
\]

D

\[
\begin{array}{c|cccc}
 x & 0 & 2 & 5 & 3 \\
 y & 7 & 3 & 0 & 2 \\
\end{array}
\]

40 Which is a zero of the function

\[ f(x) = x^2 + 6x - 7 \]

F -7
G -6
H 7
J 41

41 Jill was looking at a picture of herself and 3 friends. She measured the height of her image as 10 centimeters. If Jill is actually 60 inches tall, which equation can she use to find \( h \), the actual height in inches, of one of her friends who is \( c \) centimeters tall in the picture?

A \( h = 10c \)
B \( h = 6c \)
C \( h = \frac{5}{3}c \)
D \( h = \frac{1}{6}c \)

42 The gas pressure in a chamber varies directly with the temperature in the chamber. If the pressure in the chamber is 150 atmospheres (atm) when the chamber is at 50°F, what is the pressure in the chamber when the temperature of the chamber is 75°F?

F 175 atm
G 200 atm
H 225 atm
J 275 atm
43 \[
\begin{bmatrix}
3 & 7 \\
4 & 6
\end{bmatrix} - \begin{bmatrix}
-8 & 2 \\
6 & -2
\end{bmatrix}
\]
is equal to which matrix?

A \[
\begin{bmatrix}
0 & 5 \\
-2 & 4
\end{bmatrix}
\]

B \[
\begin{bmatrix}
11 & 5 \\
-2 & 8
\end{bmatrix}
\]

C \[
\begin{bmatrix}
-9 & 12 \\
24 & -12
\end{bmatrix}
\]

D \[
\begin{bmatrix}
6 & -5 \\
2 & 4
\end{bmatrix}
\]

44 The number of car sales for May 2000 at Auto One are:

<table>
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<tr>
<th></th>
<th>Compacts</th>
<th>UV</th>
<th>Luxury</th>
</tr>
</thead>
<tbody>
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<td>Bob</td>
<td>14</td>
<td>8</td>
<td>6</td>
</tr>
<tr>
<td>Carol</td>
<td>7</td>
<td>13</td>
<td>1</td>
</tr>
<tr>
<td>Blanca</td>
<td>12</td>
<td>10</td>
<td>8</td>
</tr>
</tbody>
</table>

If the sales people get a $200 commission on any car they sell, which matrix shows the amount in commissions each earns?

F \[
\begin{bmatrix}
2,800 & 1,600 & 1,200 \\
1,400 & 2,600 & 200 \\
2,400 & 2,000 & 1,600
\end{bmatrix}
\]

G \[
\begin{bmatrix}
214 & 208 & 206 \\
207 & 213 & 211 \\
212 & 210 & 208
\end{bmatrix}
\]

H \[
\begin{bmatrix}
186 & 192 & 194 \\
193 & 187 & 199 \\
188 & 190 & 192
\end{bmatrix}
\]

J \[
\begin{bmatrix}
1,600 & 1,000 & 800 \\
900 & 1,500 & 300 \\
1,400 & 1,200 & 1,000
\end{bmatrix}
\]
45 \[ D = \begin{bmatrix} 0 & 2 \\ 1 & -3 \\ 5 & 4 \end{bmatrix} \]

\[ -2D = ? \]

\[
\begin{bmatrix}
0 & -4 \\
-2 & 6 \\
-10 & -8
\end{bmatrix}
\]

\[
\begin{bmatrix}
-2 & 0 \\
-1 & -5 \\
3 & 2
\end{bmatrix}
\]

\[
\begin{bmatrix}
-2 & -4 \\
-2 & 6 \\
-10 & -8
\end{bmatrix}
\]

\[
\begin{bmatrix}
0 & 2 \\
-2 & 6 \\
-10 & 8
\end{bmatrix}
\]

47 The stem-and-leaf plot shows the results of a science experiment in which 12 plants were each given a different combination of water and nutrients over a period of time and their growth in millimeters measured.

<table>
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<th>Millimeters Growth</th>
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<tr>
<td>0 8</td>
</tr>
<tr>
<td>1 2,4,4,4,5,7,8</td>
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<tr>
<td>2 2,4,6</td>
</tr>
<tr>
<td>3 1</td>
</tr>
</tbody>
</table>

What was the median number of millimeters of growth?

A 14
B 15
C 16
D 17

46 Barry's daily grades for one grading period are shown below.

94, 88, 87, 92, 78, 88, 93, 100, 92, 90, 92, 85

What was the mode of his daily grades?

F 93
G 92
H 91
J 90
48 Connie made a scatterplot comparing the shoulder heights of her friends’ dogs to their weights. Connie’s dog stands 28 inches to his shoulder. Using a line of best fit for the plot, which is the best prediction for her dog’s weight?

F 40 pounds
G 55 pounds
H 65 pounds
J 70 pounds

49 Scott made a box-and-whisker graph of the soccer goals made by the players in his district. What is the range of the goals made by the players?

A 24
B 18
C 6
D 4

50 Which equation best represents the data shown in the scatterplot?

F $y = 2x - 2$

G $y = \frac{x}{2} - 2$

H $y = 2x + 2$

J $y = x - 1$
## Answer Key

<table>
<thead>
<tr>
<th>Test Sequence</th>
<th>Correct Answer</th>
<th>Reporting Category</th>
<th>Reporting Category Description</th>
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