Algebra Prep 4

1

In a football tournament, each team plays all the other teams twice. The number of total games played depends on the number of teams in the tournament, as shown in the table below.

Number of Games Played

Number of Teams, n	Number of Games, $f(n)$
4	12
5	20
6	30
8	56

Which function, $f(n)$, gives the number of games played for n number of teams?

- **A** $f(n) = 3n$
- **B** $f(n) = 4n$
- **C** $f(n) = n^2 - 4$
- **D** $f(n) = n^2 - n$

2

Which expression describes the nth term in the sequence below?

2, 11, 26, 47, . . .

- **A** $n + 1$
- **B** $3n - 1$
- **C** $3n^2 - 1$
- **D** $n^3 + 2n - 1$

3

Observe the pattern below.

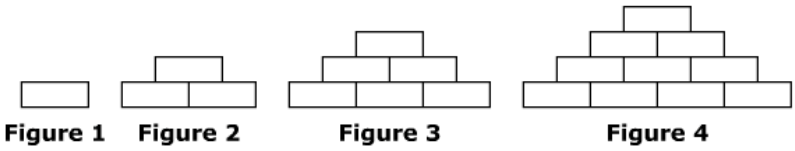


Figure 1 **Figure 2** **Figure 3** **Figure 4**

Which expression represents the number of rectangles in the nth figure?

- **A** $2n - 1$
- **B** $2n^2 - 1$
- **C** $\frac{n^2 + 1}{2}$
- **D** $\frac{n(n + 1)}{2}$

4

Which expression is equivalent to $(6x^3 + 4x^2 - x + 3) - (4x^3 + 2x - 4)$?

- **A** $10x^3 + 4x^2 + x + 7$
- **B** $10x^3 + 4x^2 + x - 1$
- **C** $2x^3 + 4x^2 + x - 1$
- **D** $2x^3 + 4x^2 - 3x + 7$

5

From 2005 to 2010, the sales of two different products, *P* and *Q*, can be modeled by $P = -8.5t^2 + 45.6t + 325.5$ and $Q = 2.9t^2 - 27.3t + 220.4$, where *t* represents the number of years since 2005. Which polynomial represents the difference, *P* minus *Q*, in the amount of sales for the two products?

- **A** $-5.6t^2 + 72.9t + 545.9$
- **B** $-5.6t^2 + 18.3t + 105.1$
- **C** $-11.4t^2 + 72.9t + 105.1$
- **D** $-11.4t^2 + 18.3t + 545.9$

6

Factor: $2x^2 + 17x - 84$

- **A** $(2x - 21)(x + 4)$
- **B** $(2x - 7)(x + 12)$
- **C** $(2x + 21)(x - 4)$
- **D** $(2x + 7)(x - 12)$

7

Which expression below is <u>not</u> equivalent to $54x^4 - 24x^2$?

- **A** $3x^2(18x^2 - 8)$
- **B** $6x^2(9x^2 - 4)$
- **C** $6x^2(3x - 2)(3x - 2)$
- **D** $6x^2(3x - 2)(3x + 2)$

8

What are the restricted values of *x* in the following expression?

$$\frac{2x^2 - 8}{x^2 + 3x}$$

- **A** $-3, 0$
- **B** $-2, 2$
- **C** $0, 3$
- **D** $1, 3$

9

Which expression is equivalent to $(2x^2 + 5x - 12)\left(\frac{x^2 - x - 2}{2x^2 - x - 3}\right)$, if $x \neq -1$ and $x \neq \frac{3}{2}$?

- **A** $(x - 4)(x + 2)$
- **B** $(x + 4)(x - 2)$
- **C** $(x - 4)(x - 2)$
- **D** $(x + 4)(x + 2)$

10

Melinda wants to spend less than $45 to buy two T-shirts and a pair of shoes. She selects a pair of shoes that costs $24. If the cost of each T-shirt she selects is x, which inequality represents the amount that she can spend on each T-shirt?

- **A** $x > 21$
- **B** $x < 21$
- **C** $x > 10.5$
- **D** $x < 10.5$

11

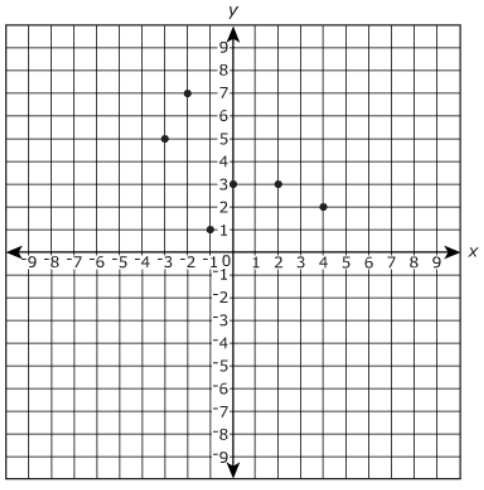
The mean temperature in the city of Alcoa for the month of January is 36°F. However, it is known that the temperature can vary from the mean by as much as 10°F. Based on this information, which is a possible value of the temperature, in degrees Celsius, on any day of January in Alcoa?

$$F = \frac{9}{5}C + 32$$

- **A** −20°C
- **B** −7°C
- **C** 5°C
- **D** 12°C

12

Which set represents the relation shown on the graph?



- **A** $\{(-3, 5), (-2, 7), (-1, 1), (0, 3), (2, 3), (4, 2)\}$
- **B** $\{(5, -3), (7, -2), (1, -1), (3, 0), (3, 2), (2, 4)\}$
- **C** $\{5, 7, 1, 3, 3, 2\}$
- **D** $\{-3, -2, -1, 0, 2, 4\}$

13

What is the domain of the relation shown in the table?

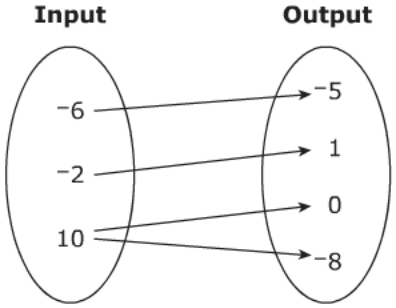
x	*y*
−2	2
3	15
4	7
1	8
9	7
7	−2

- **A** $\{-2, 3, 4, 8, 9, 7\}$
- **B** $\{-2, 3, 4, 1, 9, 7\}$
- **C** $\{2, 15, 7, 8, 7, -2\}$
- **D** $\{2, 15, 7, 1, 7, -2\}$

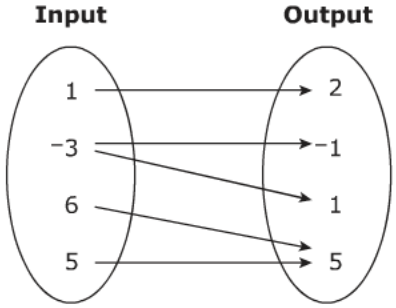
14

Which relation represents a function?

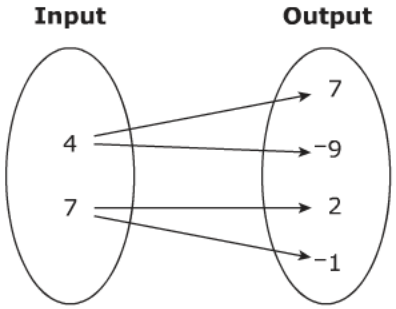
A



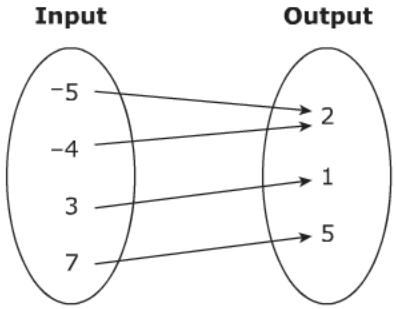
C



B



D



15

Richard and his friends sell cookies for a school fundraiser. The table shows the profit they earn selling various numbers of cookies.

Cookie Sales

Number of Cookies Sold	Profit Earned
10	$1
20	$2
30	$3
40	$4

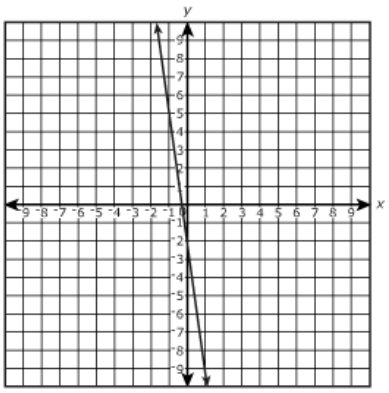
What is the range of the function that relates the profit earned to the number of cookies sold?

- **A** $\{1, 4\}$
- **B** $\{10, 40\}$
- **C** $\{1, 2, 3, 4\}$
- **D** $\{10, 20, 30, 40\}$

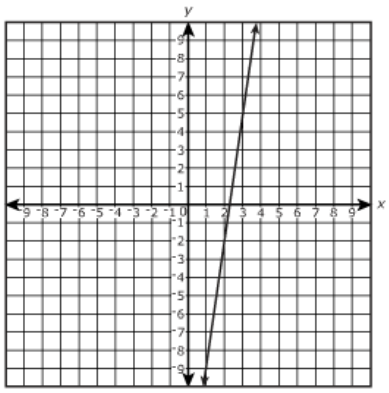
16

Which is the graph of the equation $y + 9 = -7(x - 1)$?

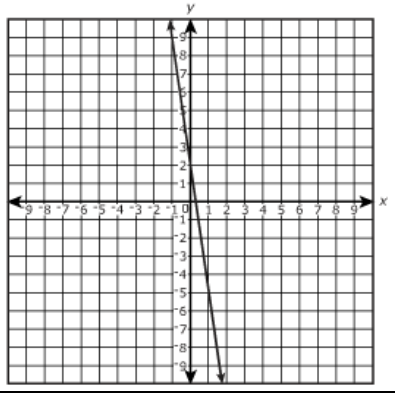
- **A**



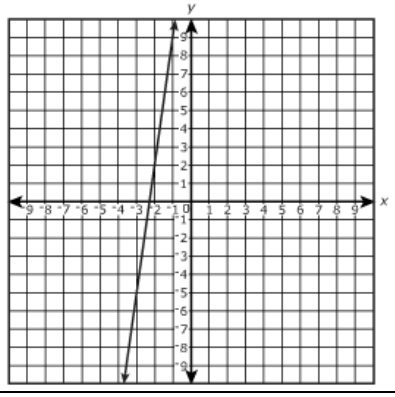
- **C**



- **B**



- **D**



17

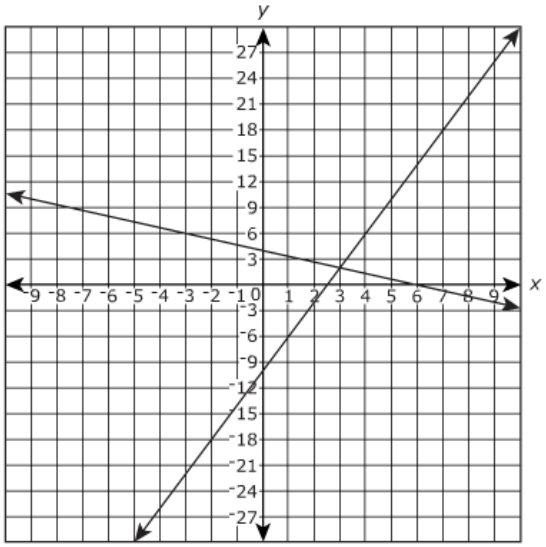
Which ordered pair (x, y) represents the solution for the system of equations shown below?

$$x - 15y = -227$$
$$15x - y = -45$$

- **A** (15, −2)
- **B** (2, 75)
- **C** (−2, 15)
- **D** (−2, −75)

18

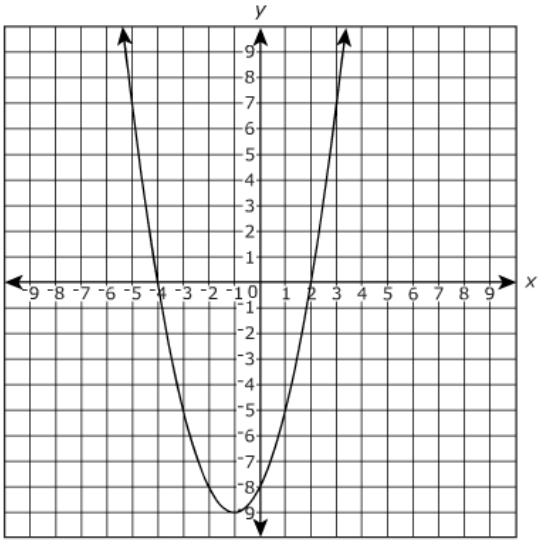
Which system of linear equations <u>best</u> represents the graph shown below?



- **A** $2x + 3y = 12$, $4x - y = 10$
- **B** $2x - 3y = 12$, $4x + y = 10$
- **C** $2x + 3y = 12$, $4x + y = 10$
- **D** $2x - 3y = 12$, $4x - y = 10$

19

What are the zeros of the quadratic function graphed below?



- **A** −4 and −2
- **B** −4 and 2
- **C** 4 and −2
- **D** 4 and 2

20

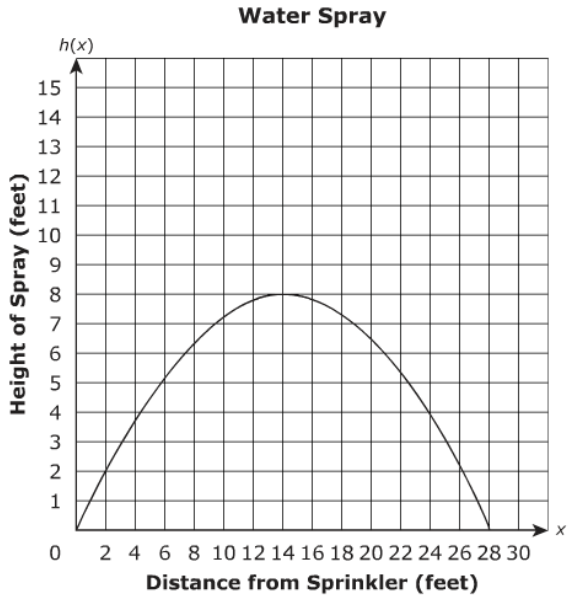
What are the solutions to the quadratic equation shown below?

$$21x^2 = 2x + 3$$

- **A** $\frac{3}{7}, -\frac{1}{3}$
- **B** $\frac{1}{3}, \frac{3}{7}$
- **C** $-\frac{3}{7}, \frac{1}{3}$
- **D** $-\frac{1}{3}, -\frac{3}{7}$

21

The height of the water spray from a sprinkler is modeled using a quadratic function, where $h(x)$ represents the height of the spray and x represents the horizontal distance from the sprinkler.

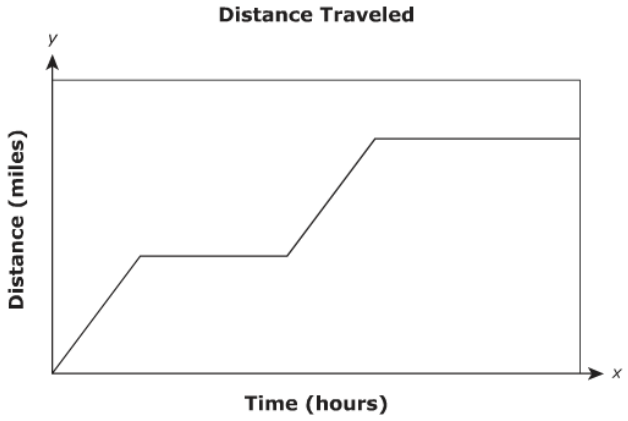


What is the maximum height of the water spray?

- **A** 8 feet
- **B** 14 feet
- **C** 16 feet
- **D** 28 feet

22

The graph below shows the relationship between the distance traveled by a car and time.



What do the two horizontal segments of the graph represent?

- **A** a car driving at a decreasing speed
- **B** a car driving at an increasing speed
- **C** a car driving on level ground
- **D** a car stopped in traffic