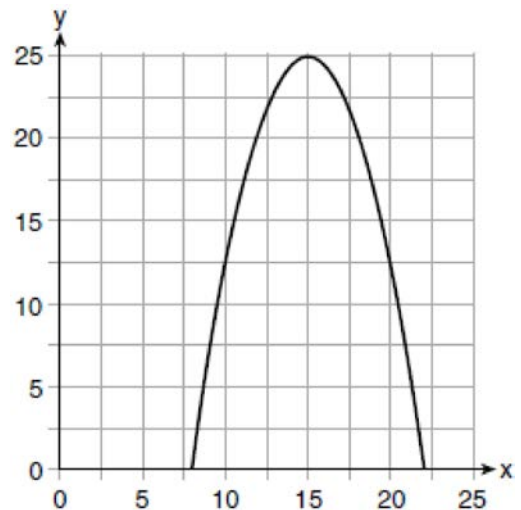


F.IF.C.8: Vertex Form of a Quadratic

- In the function $f(x) = (x - 2)^2 + 4$, the minimum value occurs when x is
 - 1) -2
 - 2) 2
 - 3) -4
 - 4) 4
- If Lylah completes the square for $f(x) = x^2 - 12x + 7$ in order to find the minimum, she must write $f(x)$ in the general form $f(x) = (x - a)^2 + b$. What is the value of a for $f(x)$?
 - 1) 6
 - 2) -6
 - 3) 12
 - 4) -12
- Which equation is equivalent to $y = x^2 + 24x - 18$?
 - 1) $y = (x + 12)^2 - 162$
 - 2) $y = (x + 12)^2 + 126$
 - 3) $y = (x - 12)^2 - 162$
 - 4) $y = (x - 12)^2 + 126$
- The function $f(x) = 3x^2 + 12x + 11$ can be written in vertex form as
 - 1) $f(x) = (3x + 6)^2 - 25$
 - 2) $f(x) = 3(x + 6)^2 - 25$
 - 3) $f(x) = 3(x + 2)^2 - 1$
 - 4) $f(x) = 3(x + 2)^2 + 7$
- Which equation is equivalent to $y - 34 = x(x - 12)$?
 - 1) $y = (x - 17)(x + 2)$
 - 2) $y = (x - 17)(x - 2)$
 - 3) $y = (x - 6)^2 + 2$
 - 4) $y = (x - 6)^2 - 2$
- Which equation and ordered pair represent the correct vertex form and vertex for $j(x) = x^2 - 12x + 7$?
 - 1) $j(x) = (x - 6)^2 + 43, (6, 43)$
 - 2) $j(x) = (x - 6)^2 + 43, (-6, 43)$
 - 3) $j(x) = (x - 6)^2 - 29, (6, -29)$
 - 4) $j(x) = (x - 6)^2 - 29, (-6, -29)$

- The graph of a quadratic function is shown below.



An equation that represents the function could be

- 1) $q(x) = \frac{1}{2}(x + 15)^2 - 25$
 - 2) $q(x) = -\frac{1}{2}(x + 15)^2 - 25$
 - 3) $q(x) = \frac{1}{2}(x - 15)^2 + 25$
 - 4) $q(x) = -\frac{1}{2}(x - 15)^2 + 25$
- Determine and state the vertex of $f(x) = x^2 - 2x - 8$ using the method of completing the square.
 - Use the method of completing the square to determine the vertex of $f(x) = x^2 - 14x - 15$. State the coordinates of the vertex.
 - a) Given the function $f(x) = -x^2 + 8x + 9$, state whether the vertex represents a maximum or minimum point for the function. Explain your answer.
b) Rewrite $f(x)$ in vertex form by completing the square.

F.IF.C.8: Vertex Form of a Quadratic Answer Section

1 ANS: 2 REF: 011601ai

2 ANS: 1

$$x^2 - 12x + 7$$

$$x^2 - 12x + 36 - 29$$

$$(x - 6)^2 - 29$$

REF: 081520ai

3 ANS: 1

$$y = x^2 + 24x + 144 - 18 - 144$$

$$y = (x + 12)^2 - 162$$

REF: 081911ai

4 ANS: 3

$$3(x^2 + 4x + 4) - 12 + 11$$

$$3(x + 2)^2 - 1$$

REF: 081621ai

5 ANS: 4

$$y - 34 = x^2 - 12x$$

$$y = x^2 - 12x + 34$$

$$y = x^2 - 12x + 36 - 2$$

$$y = (x - 6)^2 - 2$$

REF: 011607ai

6 ANS: 3

$$j(x) = x^2 - 12x + 36 + 7 - 36$$

$$= (x - 6)^2 - 29$$

REF: 061616ai

7 ANS: 4

Vertex (15,25), point (10,12.5) $12.5 = a(10 - 15)^2 + 25$

$$-12.5 = 25a$$

$$-\frac{1}{2} = a$$

REF: 061716ai

8 ANS:

$$f(x) = (x^2 - 2x + 1) - 8 - 1 = (x - 1)^2 - 9 \quad (1, -9)$$

REF: 061932ai

9 ANS:

$$f(x) = x^2 - 14x + 49 - 15 - 49 = (x - 7)^2 - 64 \quad (7, -64)$$

REF: 062130ai

10 ANS:

The vertex represents a maximum since $a < 0$. $f(x) = -x^2 + 8x + 9$

$$\begin{aligned} &= -(x^2 - 8x - 9) \\ &= -(x^2 - 8x + 16) + 9 + 16 \\ &= -(x - 4)^2 + 25 \end{aligned}$$

REF: 011536ai