

Bell Work:

1. What is the formula when completing the square to find the new c ?
2. What is the domain in interval notation of the absolute value parent function?
3. What is the slope of the line with a function of $5x - 2y = 12$?
4. What is the vertex? Show all work.

$$f(x) = x^2 + 10x + 17$$

Find the vertex and then graph the quadratic function.

$$f(x) = -x^2 + 6x - 7$$

$$f(x) + 7 = -x^2 + 6x$$

$$f(x) + 7 = -(x^2 - 6x)$$

$$f(x) + 7 - 9 = -(x^2 - 6x + 9)$$

$$f(x) - 2 = -(x - 3)^2$$

$$f(x) = -(x - 3)^2 + 2$$

(3, 2)

Move the c over.

Factor out a negative.

Find a new c .

Half of b , then square it.

$$c = \left(\frac{b}{2}\right)^2$$

Because of the negative in front, subtract the new c on the other side.

Factor.

Move the number back.

Find the vertex and then graph the quadratic function.

$$f(x) = -x^2 + 6x - 7$$

$$f(x) + 7 = -x^2 + 6x$$

$$f(x) + 7 = -(x^2 - 6x)$$

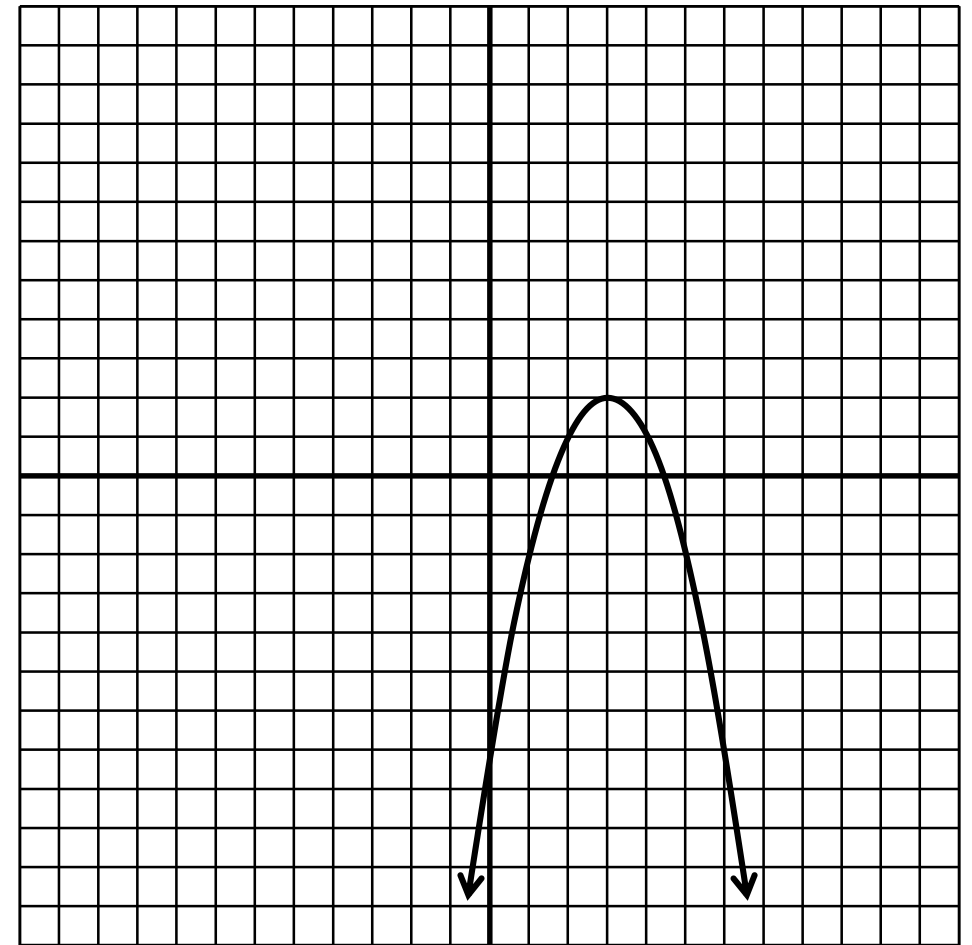
$$f(x) + 7 - 9 = -(x^2 - 6x + 9)$$

$$f(x) - 2 = -(x - 3)^2$$

$$f(x) = -(x - 3)^2 + 2$$

(3, 2)

L/R	U/D
1	1
2	4
3	9
4	16



Find the vertex and then graph the quadratic function.

$$f(x) = -x^2 - 2x + 8$$

$$f(x) - 8 = -x^2 + 2x$$

$$f(x) - 8 = -(x^2 + 2x)$$

$$f(x) - 8 - 1 = -(x^2 + 2x + 1)$$

$$f(x) - 9 = -(x + 1)^2$$

$$f(x) = -(x + 1)^2 + 9$$

$$(-1, 9)$$

Move the c over.

Factor out a negative.

Find a new c .

Half of b , then square it.

$$c = \left(\frac{b}{2}\right)^2$$

Because of the negative in front, subtract the new c on the other side.

Factor.

Move the number back.

Find the vertex and then graph the quadratic function.

$$f(x) = -x^2 - 2x + 8$$

$$f(x) - 8 = -x^2 + 2x$$

$$f(x) - 8 = -(x^2 + 2x)$$

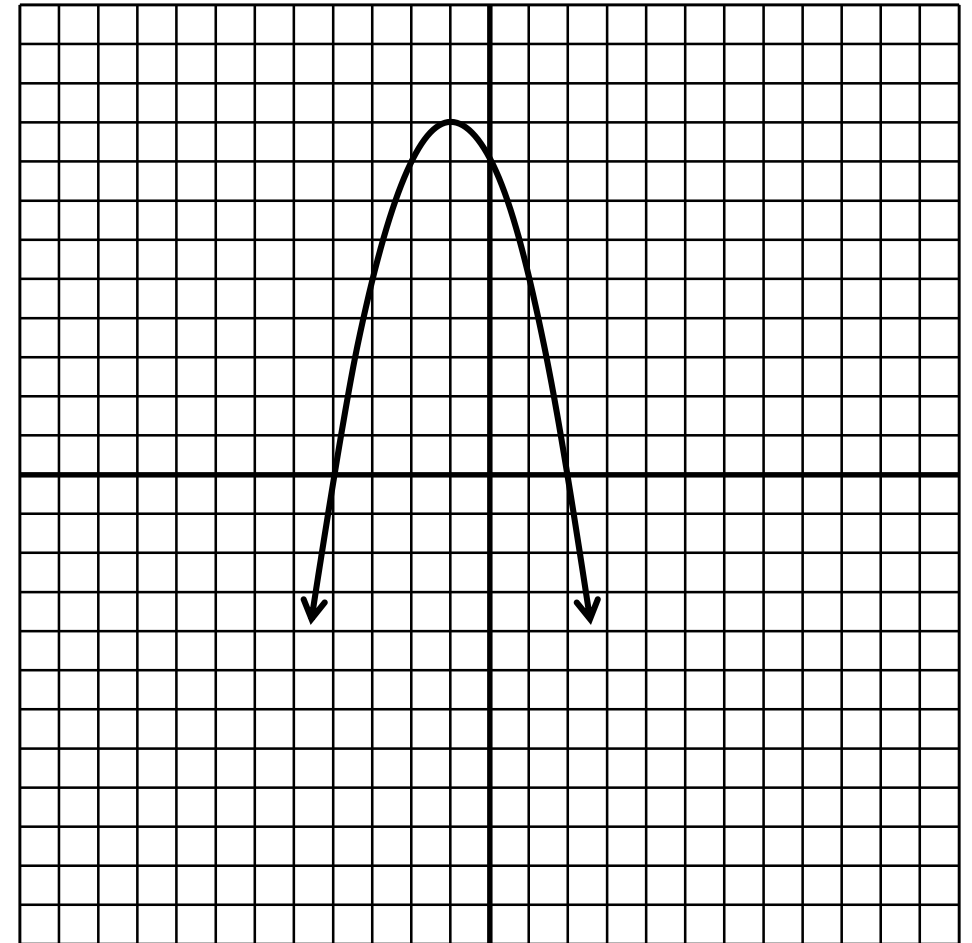
$$f(x) - 8 - 1 = -(x^2 + 2x + 1)$$

$$f(x) - 9 = -(x + 1)^2$$

$$f(x) = -(x + 1)^2 + 9$$

$$(-1, 9)$$

L/R	U/D
1	1
2	4
3	9
4	16



Find the vertex and then graph the quadratic function.

$$f(x) = 2x^2 + 4x + 9$$

$$f(x) - 9 = 2x^2 + 4x$$

$$f(x) - 9 = 2(x^2 + 2x)$$

$$f(x) - 9 + 2 = 2(x^2 + 2x + 1)$$

$$f(x) - 7 = 2(x + 1)^2$$

$$f(x) = 2(x + 1)^2 + 7$$

$$(-1, -7)$$

Move the c over.

Factor out a GCF.

Find a new c .

Half of b , then square it.

$$c = \left(\frac{b}{2}\right)^2$$

Multiply c times the GCF and add it to the other side.

Factor.

Move the number back.

Find the vertex and then graph the quadratic function.

$$f(x) = 2x^2 + 4x + 9$$

$$f(x) - 9 = 2x^2 + 4x$$

$$f(x) - 9 = 2(x^2 + 2x)$$

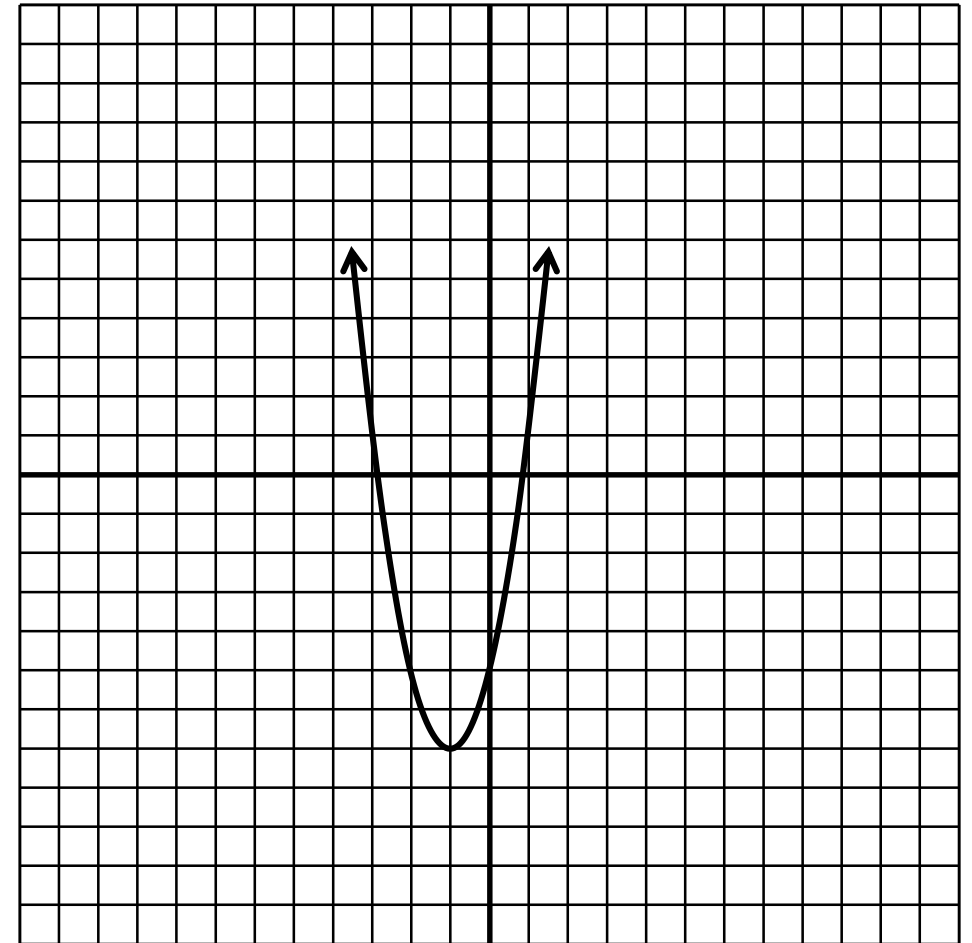
$$f(x) - 9 + 2 = 2(x^2 + 2x + 1)$$

$$f(x) - 7 = 2(x + 1)^2$$

$$f(x) = 2(x + 1)^2 + 7$$

$$(-1, -7)$$

L/R	U/D	x2
1	1	2
2	4	8
3	9	18
4	16	



Find the vertex and then graph the quadratic function.

$$f(x) = -3x^2 - 24x - 40$$

$$f(x) + 40 = -3x^2 - 24x$$

$$f(x) + 40 = -3(x^2 + 8x)$$

$$f(x) + 40 - 48 = -3(x^2 + 8x + 16)$$

$$f(x) - 8 = -3(x + 4)^2$$

$$f(x) = -3(x + 4)^2 + 8$$

$$(-4, 8)$$

Move the c over.

Factor out a GCF.

Find a new c .

Half of b , then square it.

$$c = \left(\frac{b}{2}\right)^2$$

Multiply c times the GCF and add it to the other side.

Factor.

Move the number back.

Find the vertex and then graph the quadratic function.

$$f(x) = -3x^2 - 24x - 40$$

$$f(x) + 40 = -3x^2 - 24x$$

$$f(x) + 40 = -3(x^2 + 8x)$$

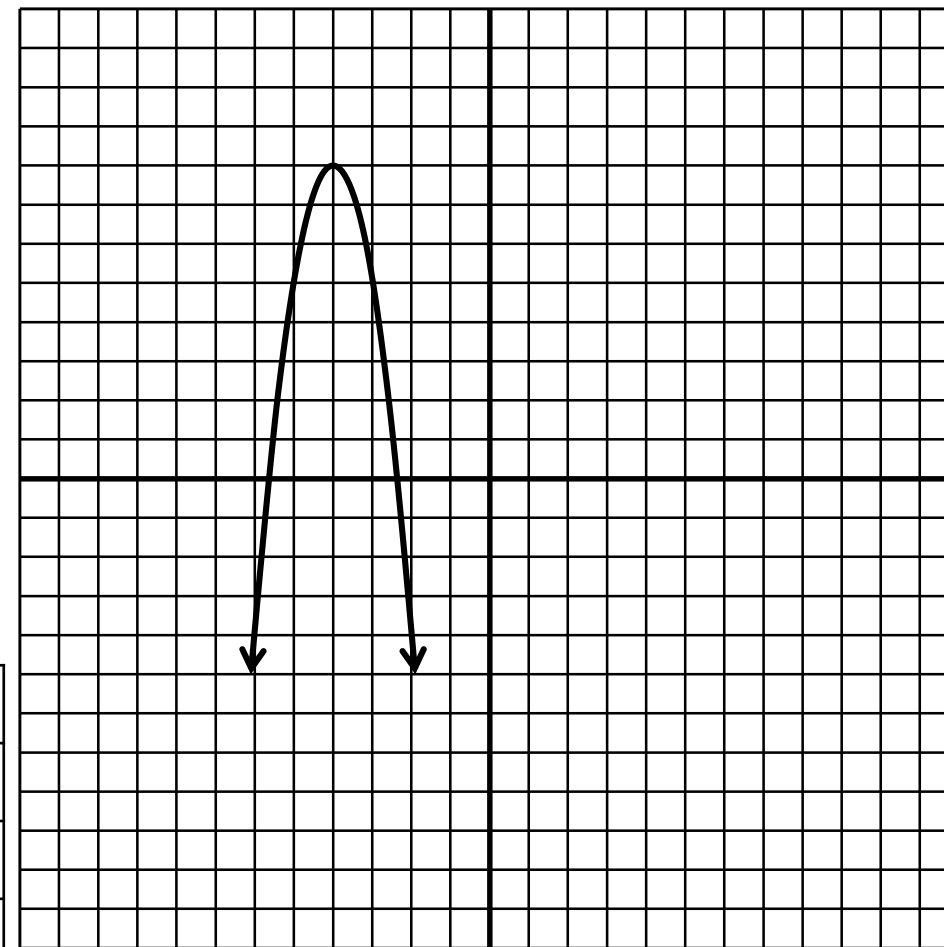
$$f(x) + 40 - 48 = -3(x^2 + 8x + 16)$$

$$f(x) - 8 = -3(x + 4)^2$$

$$f(x) = -3(x + 4)^2 + 8$$

$(-4, 8)$

L/R	U/D	x3
1	1	3
2	4	12
3	9	18
4	16	



Find the vertex of this quadratic function.

$$f(x) = 3x^2 - 18x + 29$$

$$f(x) - 29 = 3x^2 - 18x$$

$$f(x) - 29 = 3(x^2 - 6x)$$

$$f(x) - 29 + 27 = 3(x^2 - 6x + 9)$$

$$f(x) - 2 = 3(x - 3)^2$$

$$f(x) = 3(x - 3)^2 + 2$$

(3, 2)

Move the c over.

Factor out a GCF.

Find a new c .

Half of b , then square it.

$$c = \left(\frac{b}{2}\right)^2$$

Multiply c times the GCF and add it to the other side.

Factor.

Move the number back.

Find the vertex of this quadratic function.

$$f(x) = 3x^2 - 18x + 23$$

$$f(x) - 23 = 3x^2 - 18x$$

$$f(x) - 23 = 3(x^2 - 6x)$$

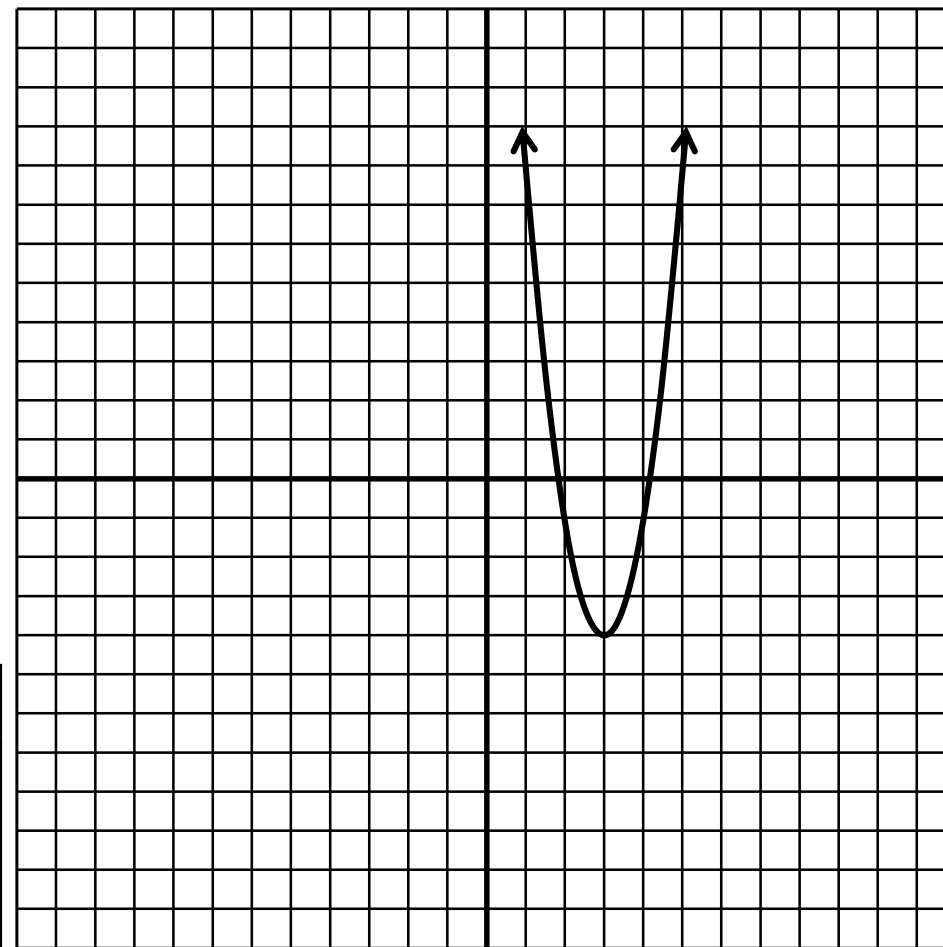
$$f(x) - 23 + 27 = 3(x^2 - 6x + 9)$$

$$f(x) + 4 = 3(x - 3)^2$$

$$f(x) = 3(x - 3)^2 - 4$$

(3, 2)

L/R	U/D	x3
1	1	3
2	4	12
3	9	18
4	16	



Find the vertex of this quadratic function.

$$f(x) = 2x^2 - 16x + 27$$

$$f(x) - 27 = 2x^2 - 16x$$

$$f(x) - 27 = 2(x^2 - 8x)$$

$$f(x) - 27 + 32 = 2(x^2 - 8x + 16)$$

$$f(x) + 5 = 2(x - 4)^2$$

$$f(x) = 2(x - 4)^2 - 5$$

$$(4, -5)$$

Move the c over.

Factor out a GCF.

Find a new c .

Half of b , then square it.

$$c = \left(\frac{b}{2}\right)^2$$

Multiply c times the GCF and add it to the other side.

Factor.

Move the number back.

Find the vertex of this quadratic function.

$$f(x) = 2x^2 - 16x + 27$$

$$f(x) - 27 = 2x^2 - 16x$$

$$f(x) - 27 = 2(x^2 - 8x)$$

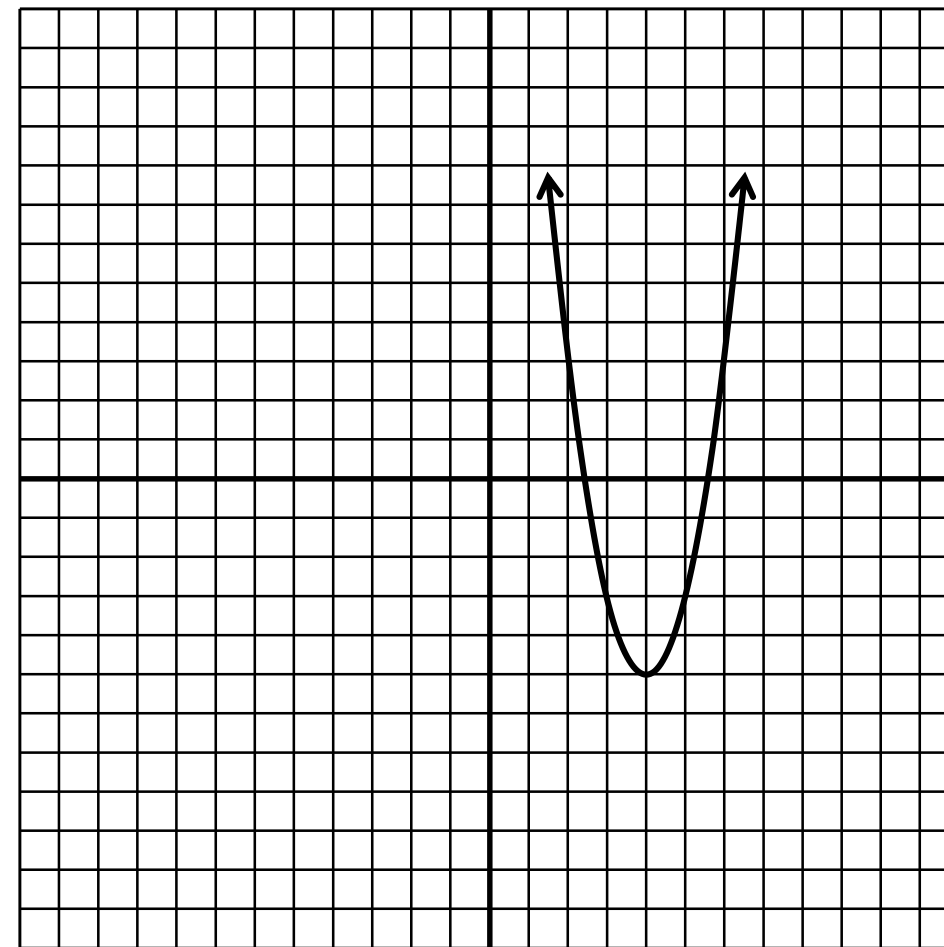
$$f(x) - 27 + 32 = 2(x^2 - 8x + 16)$$

$$f(x) + 5 = 2(x - 4)^2$$

$$f(x) = 2(x - 4)^2 - 5$$

$$(4, -5)$$

L/R	U/D	X2
1	1	2
2	4	8
3	9	18
4	16	



Find the vertex of this quadratic function.

$$f(x) = -2x^2 + 20x - 63$$

$$f(x) + 63 = -2x^2 + 20x$$

$$f(x) + 63 = -2(x^2 - 10x)$$

$$f(x) + 63 - 75 = -2(x^2 - 10x + 25)$$

$$f(x) - 12 = -2(x - 5)^2$$

$$f(x) = -2(x - 5)^2 + 12$$

$$(5, 12)$$

Move the c over.

Factor out a GCF.

Find a new c .

Half of b , then square it.

$$c = \left(\frac{b}{2}\right)^2$$

Multiply c times the GCF and add it to the other side.

Factor.

Move the number back.

Find the vertex of this quadratic function.

$$f(x) = -2x^2 + 20x - 63$$

$$f(x) + 63 = -2x^2 + 20x$$

$$f(x) + 63 = -2(x^2 - 10x)$$

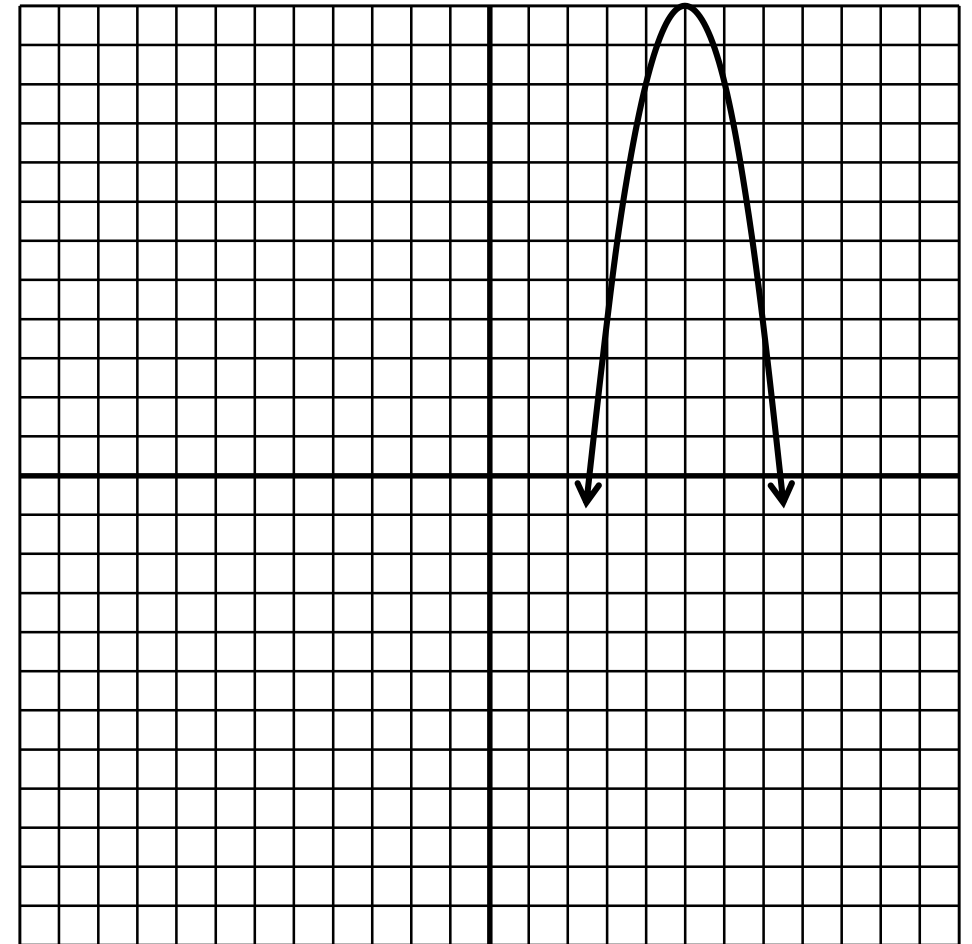
$$f(x) + 63 - 75 = -2(x^2 - 10x + 25)$$

$$f(x) - 12 = -2(x - 5)^2$$

$$f(x) = -2(x - 5)^2 + 12$$

(5, 12)

L/R	U/D	x2
1	1	2
2	4	8
3	9	18
4	16	



Assignment:

**Finding the Vertex of Quadratic Functions by
Completing the Square B Worksheet**