

Special forms of quadratic functions reveal ordered pair locations of **key parabola points**.

Standard Form	Factored Form	Vertex Form
$f(x) = ax^2 + bx + c$	$f(x) = a(x - m)(x - n)$	$f(x) = a(x - h)^2 + k$
y-intercept $(0, c)$	x-intercepts $(m, 0)$ & $(n, 0)$	Vertex (h, k)

Note: Values in parentheses come out as opposites.

$f(x) = -2x^2 + 4x + 6$
y-intercept $(0, 6)$

$f(x) = -2(x + 1)(x - 3)$
x-intercepts $(-1, 0)$ & $(3, 0)$

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

CFU

Which quadratic function has a **y-intercept** at $(0, -7)$? Explain.

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

Which quadratic function has **x-intercepts** at $(5, 0)$ and $(-8, 0)$? Explain.

- A $f(x) = 5(x - 5)^2 - 8$
- B $f(x) = 5x^2 + 5x - 8$
- C $f(x) = 5(x - 5)(x + 8)$

Which quadratic function has a **vertex** location $(-4, 10)$? Explain.

- A $f(x) = -3(x - 4)^2 + 10$
- B $f(x) = -2(x + 4)(x - 10)$
- C $f(x) = (x + 4)^2 + 10$

- 1 Identify the y-intercept from the standard form.
- 2 Identify the x-intercepts from the factored form.
- 3 Identify the vertex from the vertex form.
- 4 Plot the points and sketch the graph.

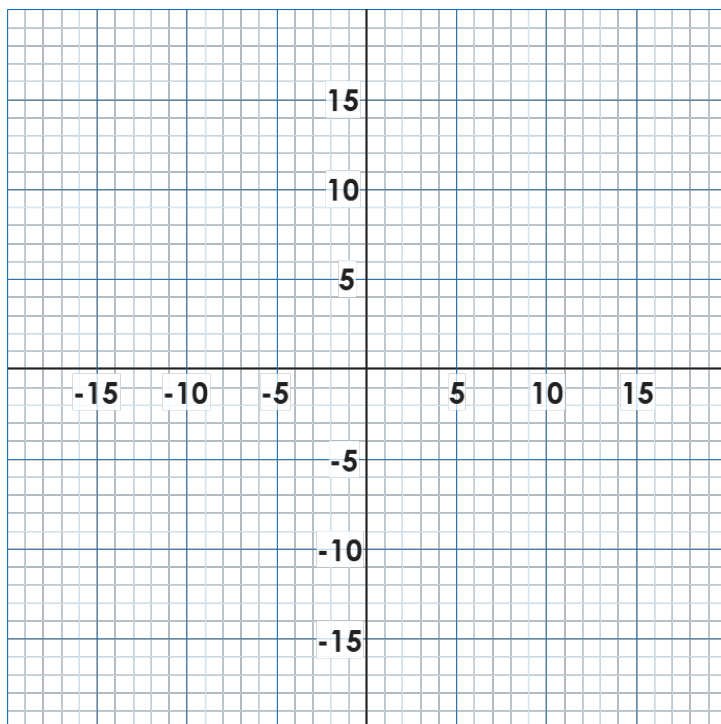
1. $f(x) = -2(x + 1)(x + 7)$

$f(x) = -2x^2 - 16x - 14$

$f(x) = -2(x + 4)^2 + 18$

	x	f(x)
y-intercept		
x-intercepts		
vertex		

maximum or minimum



- 1 Identify the y-intercept from the standard form.
- 2 Identify the x-intercepts from the factored form.
- 3 Identify the vertex from the vertex form.
- 4 Plot the points and sketch the graph.

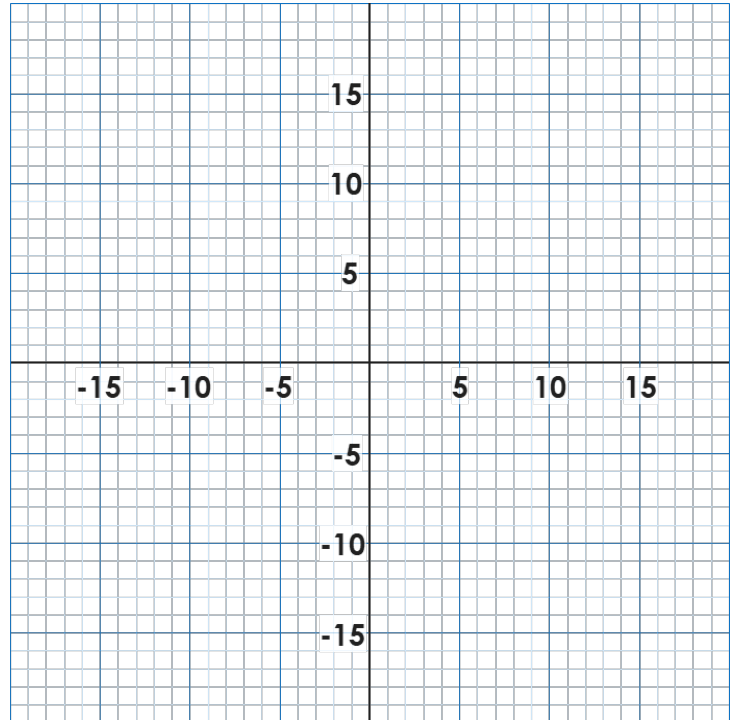
2. $f(x) = (x - 3)^2 - 4$

$f(x) = (x - 5)(x - 1)$

$f(x) = x^2 - 6x + 5$

	x	f(x)
y-intercept		
x-intercepts		
vertex		

maximum or minimum



Skill Closure

- 1 Identify the y-intercept from the standard form.
- 2 Identify the x-intercepts from the factored form.
- 3 Identify the vertex from the vertex form.
- 4 Plot the points and sketch the graph.

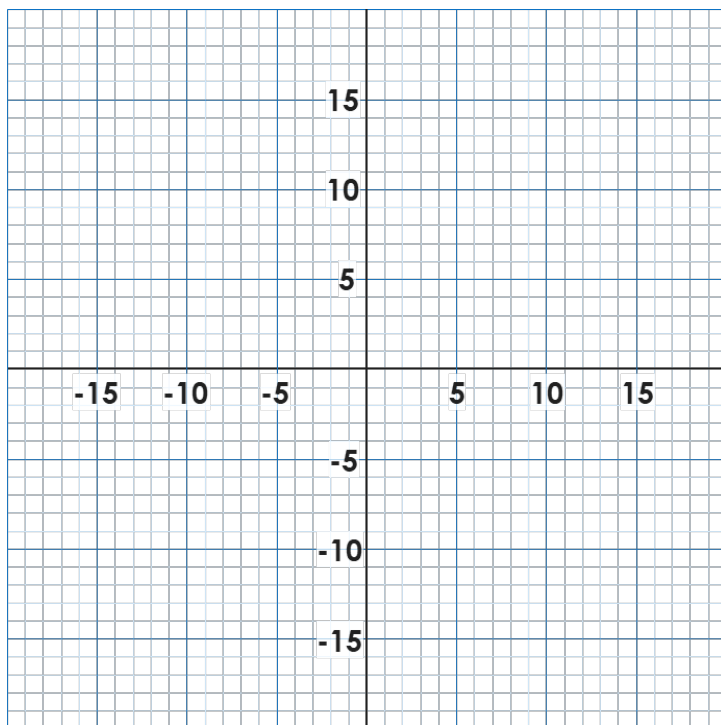
1. $f(x) = (x + 2)(x - 4)$

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

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

	x	f(x)
y-intercept		
x-intercepts		
vertex		

maximum or minimum



Concept Closure

If there is an error in the table, identify and explain it. If not, select "No errors were made."

$f(x) = -3x^2 + 18x - 15$

$f(x) = -3(x - 1)(x - 5)$

$f(x) = -3(x - 3)^2 + 12$

	x	f(x)
y-intercept	0	-15
x-intercepts	1	0
	-5	0
vertex	3	12

No errors were made.

Standard Form
 $f(x) = ax^2 + bx + c$
y-intercept
 $(0, c)$

Factored Form
 $f(x) = a(x - m)(x - n)$
x-intercepts
 $(m, 0) \text{ \& } (n, 0)$

Vertex Form
 $f(x) = a(x - h)^2 + k$
Vertex
 (h, k)

Summary Closure

What did you learn today about analyzing quadratic function forms?

- 1 Identify the y-intercept from the standard form.
- 2 Identify the x-intercepts from the factored form.
- 3 Identify the vertex from the vertex form.
- 4 Plot the points and sketch the graph.

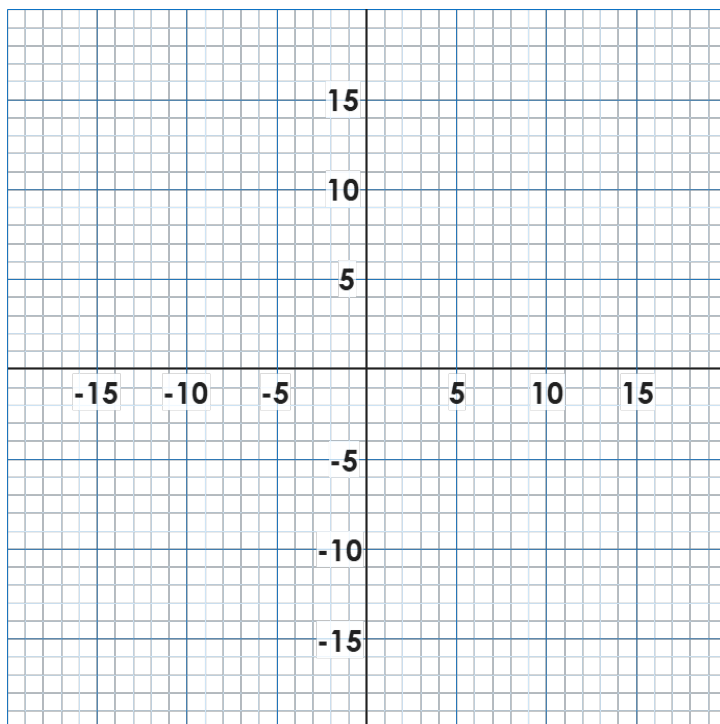
1. $f(x) = 3(x + 1)^2 - 12$

$f(x) = 3(x + 3)(x - 1)$

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

	x	f(x)
y-intercept		
x-intercepts		
vertex		

maximum or minimum



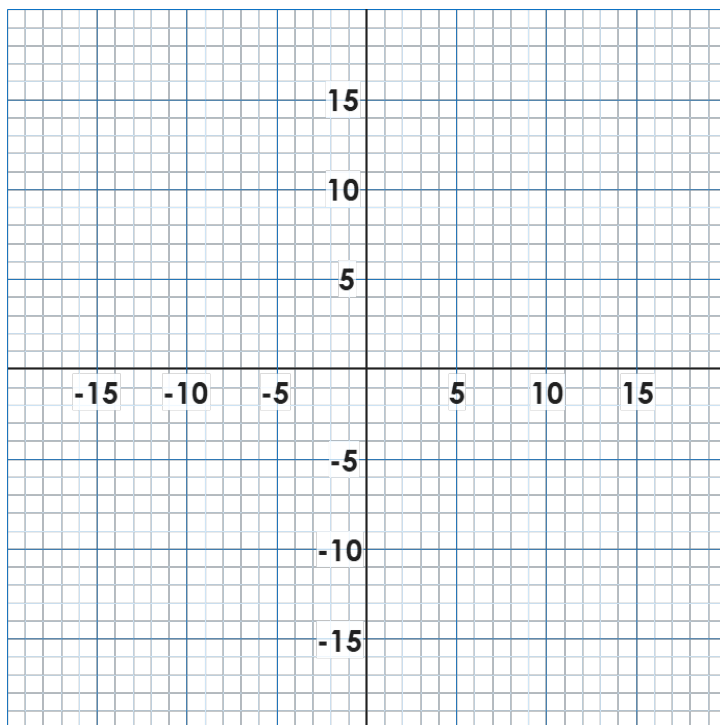
2. $f(x) = -(x - 3)(x - 5)$

$f(x) = -x^2 + 8x - 15$

$f(x) = -(x - 4)^2 + 1$

	x	f(x)
y-intercept		
x-intercepts		
vertex		

maximum or minimum



Find key parabola points and graph them.

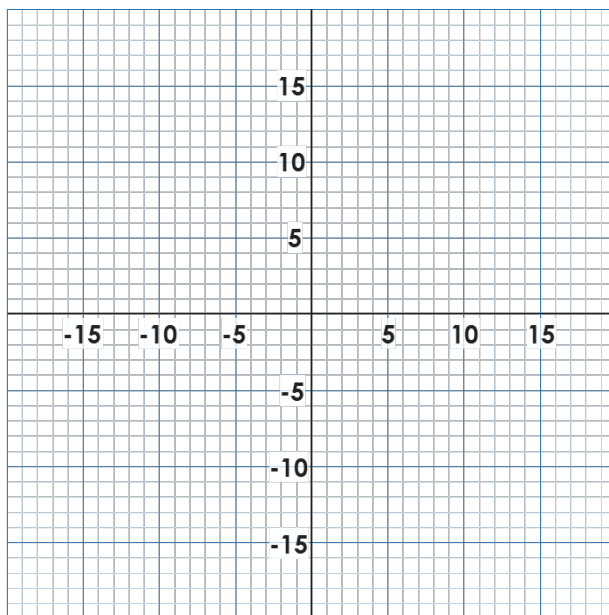
1. $f(x) = -5(x + 3)(x + 1)$

$f(x) = -5x^2 - 20x - 15$

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

	x	f(x)
y-intercept		
x-intercepts		
vertex		

maximum or minimum



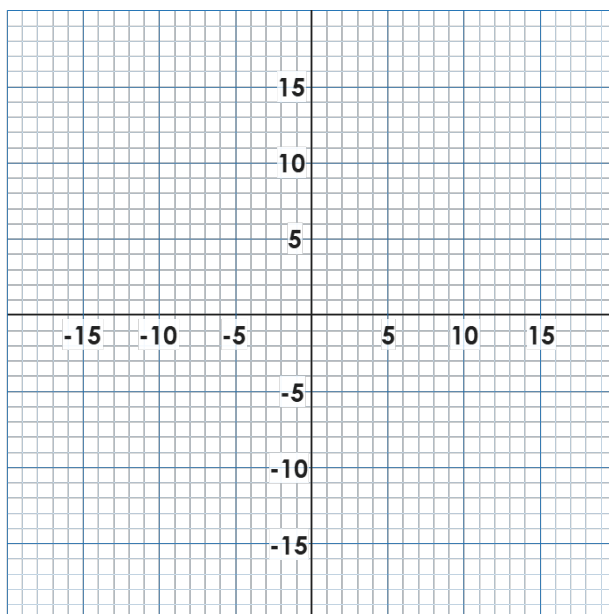
2. $f(x) = 4(x - 2)^2 - 4$

$f(x) = 4(x - 1)(x - 3)$

$f(x) = 4x^2 - 16x + 12$

	x	f(x)
y-intercept		
x-intercepts		
vertex		

maximum or minimum



If there is an error in the table, identify and explain it. If not, select "No errors were made."

3. $f(x) = x^2 + 10x + 16$

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

$f(x) = (x + 5)^2 - 9$

	x	f(x)
y-intercept	0	16
x-intercepts	-2	0
	-8	0
vertex	5	9

No errors were made.

Find key parabola points and graph them.

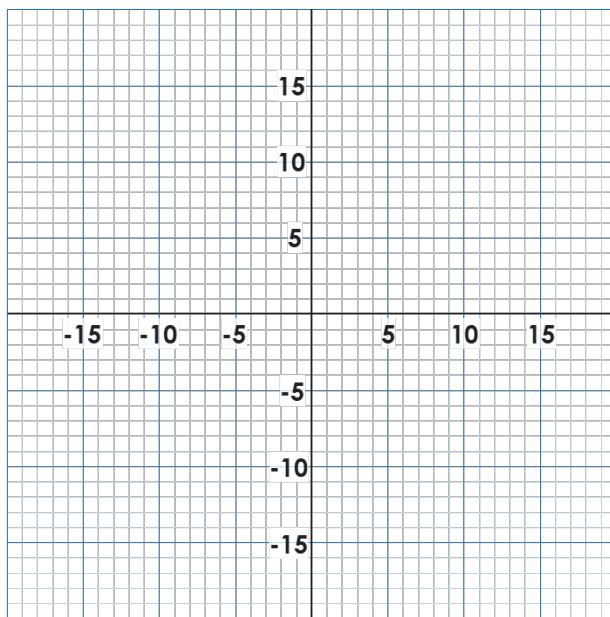
1. $f(x) = -2(x - 4)(x - 2)$

$f(x) = -2x^2 + 12x - 16$

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

	x	f(x)
y-intercept		
x-intercepts		
vertex		

maximum or minimum



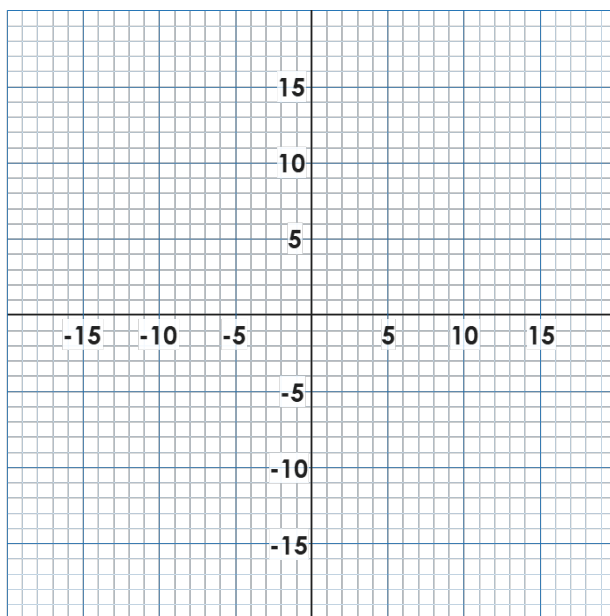
2. $f(x) = -(x + 8)(x + 2)$

$f(x) = -x^2 - 10x - 16$

$f(x) = -(x + 5)^2 + 9$

	x	f(x)
y-intercept		
x-intercepts		
vertex		

maximum or minimum



If there is an error in the table, identify and explain it. If not, select "No errors were made."

3. $f(x) = -2x^2 - 8x + 42$

$f(x) = -2(x - 3)(x + 7)$

$f(x) = -2(x + 2)^2 + 50$

	x	f(x)
y-intercept	0	16
x-intercepts	-2	0
	-8	0
vertex	5	9

No errors were made.

Find key parabola points and graph them.

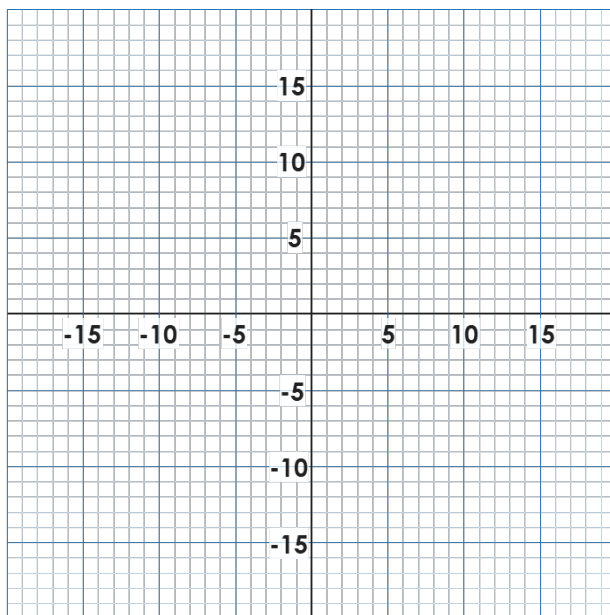
1. $f(x) = (x - 5)^2 - 16$

$f(x) = (x - 1)(x - 9)$

$f(x) = x^2 - 10x + 9$

	x	f(x)
y-intercept		
x-intercepts		
vertex		

maximum or minimum



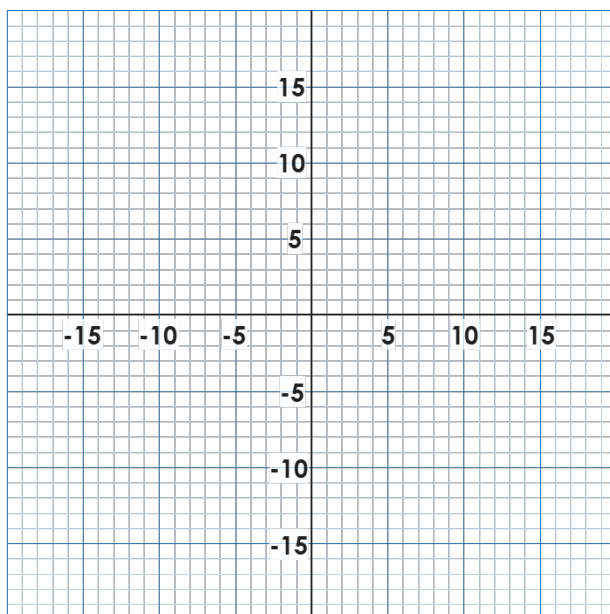
2. $f(x) = 2(x + 3)^2 - 18$

$f(x) = 2(x + 6)(x + 0)$

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

	x	f(x)
y-intercept		
x-intercepts		
vertex		

maximum or minimum



If there is an error in the table, identify and explain it. If not, select "No errors were made."

3. $f(x) = x^2 - 12x + 27$

$f(x) = (x - 3)(x - 9)$

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

	x	f(x)
y-intercept	0	16
x-intercepts	-2	0
	-8	0
vertex	5	9

No errors were made.