

Graphing Quadratic Functions

Bell Work:

1. What is a polynomial?

2. Multiply $(3b + 4)(3b - 4)$.

3. Multiply $(2b - 7)^2$.

4. Multiply and show all work $(2d^2 + 5d - 1)(5d + 1)$.

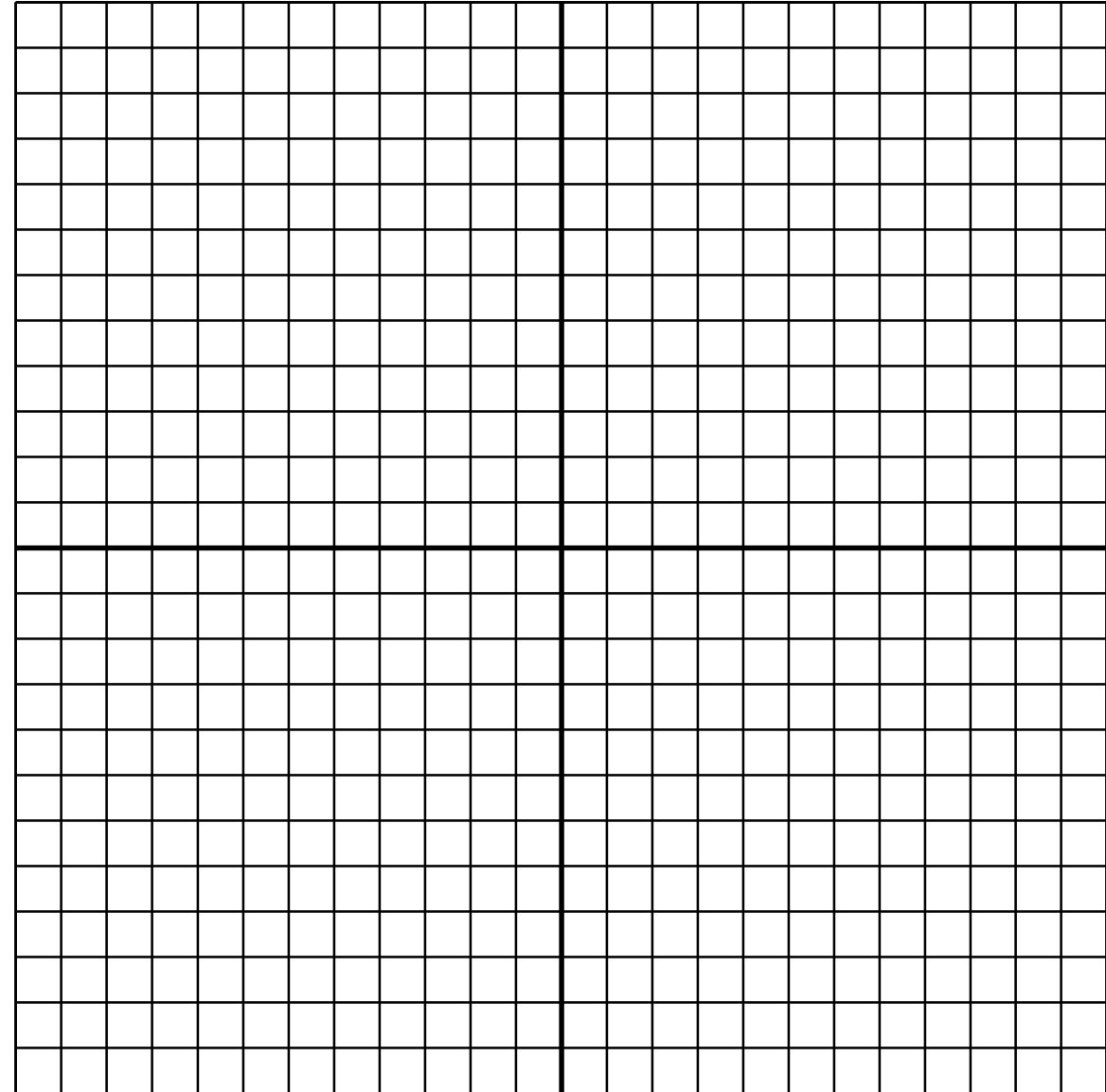
Graphing Quadratic Functions

Graph the quadratic function.

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

x	y
-7	6
-6	
-5	
-4	
-3	
-2	
-1	

$$\begin{aligned}f(-7) &= (-7 + 4)^2 - 3 \\ &= (-3)^2 - 3 \\ &= 9 - 3 = 6\end{aligned}$$



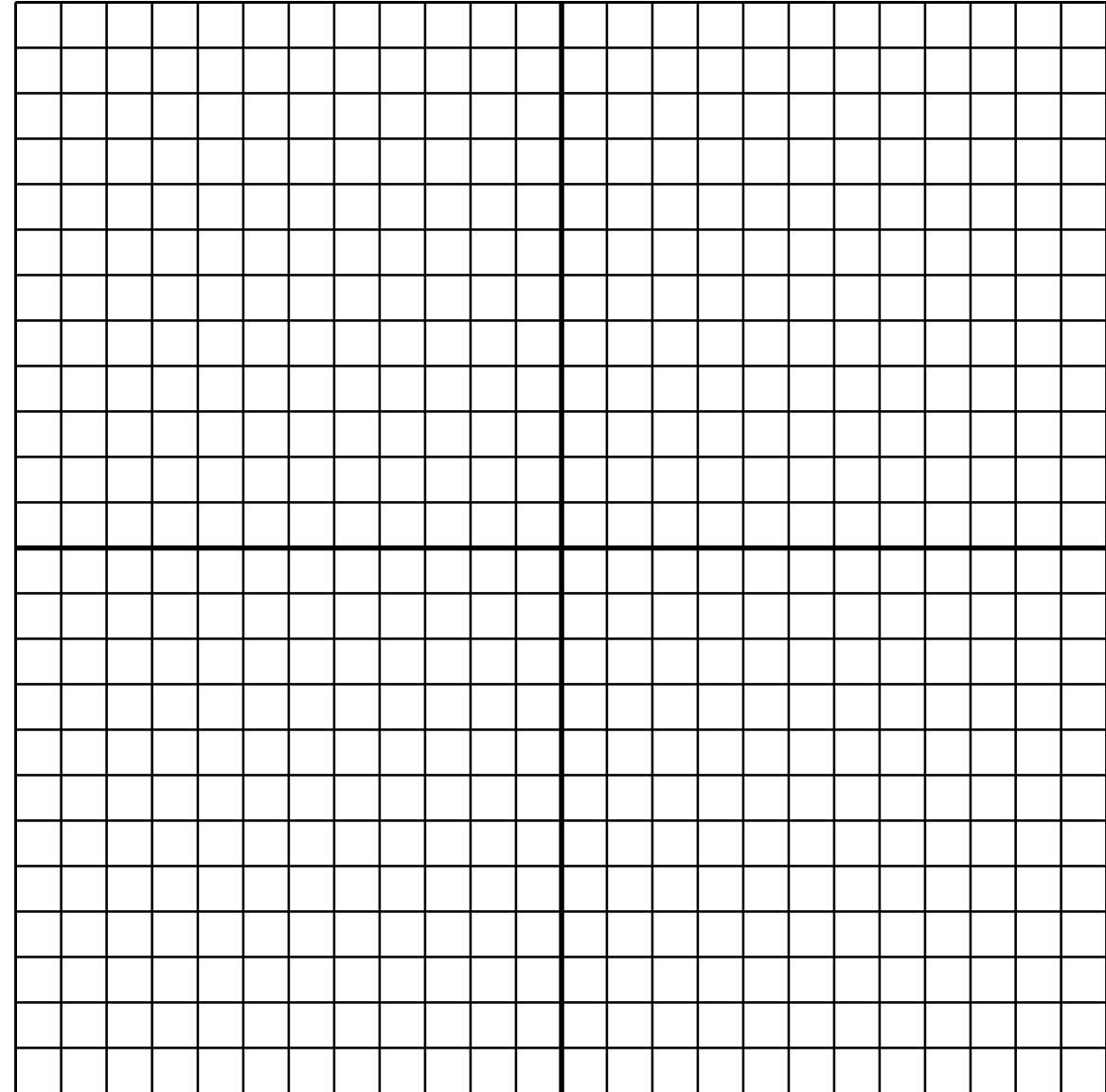
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-2	
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$$\begin{aligned}f(-6) &= (-6 + 4)^2 - 3 \\ &= (-2)^2 - 3 \\ &= 4 - 3 = 1\end{aligned}$$



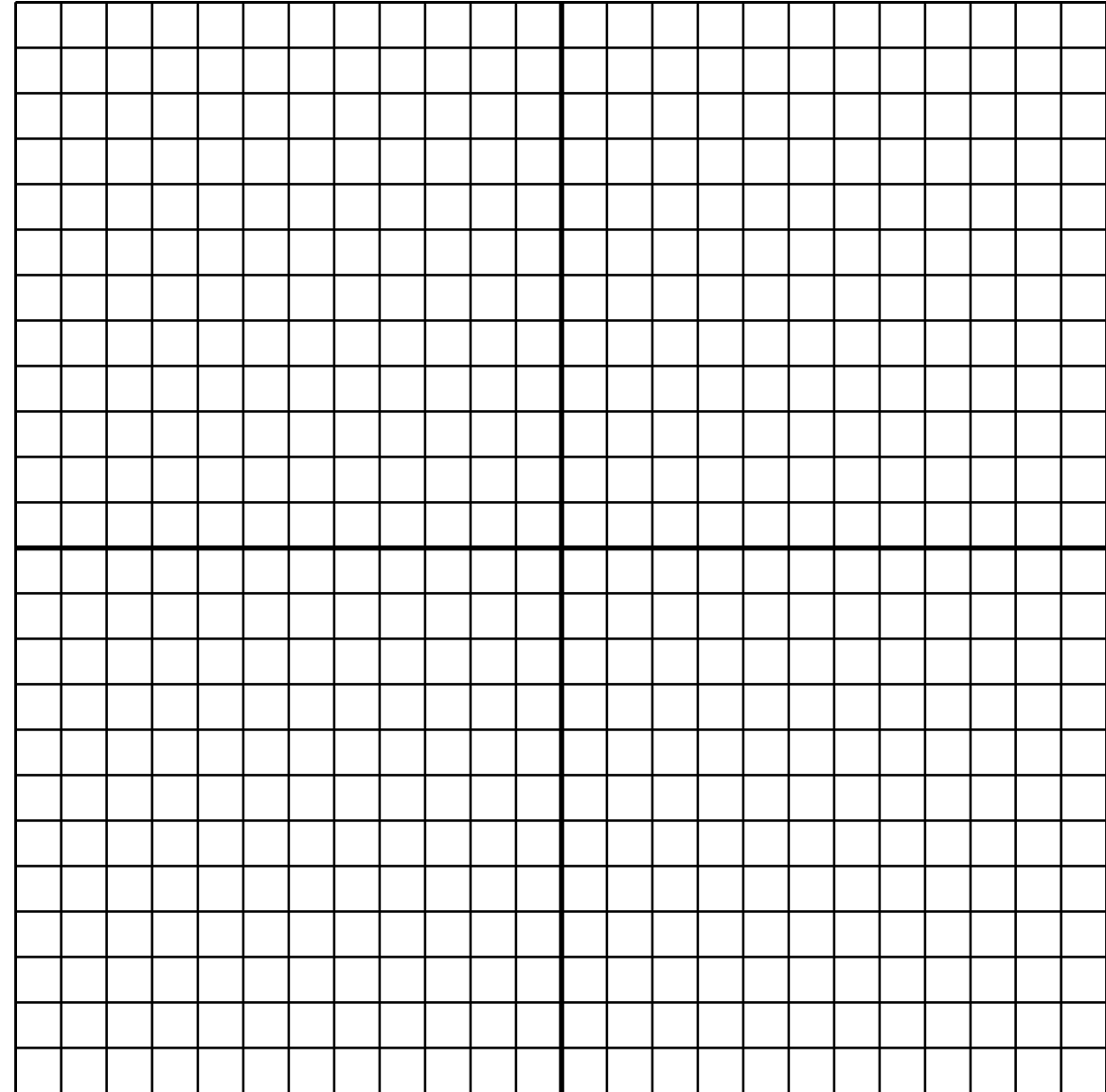
Graphing Quadratic Functions

Graph the quadratic function.

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x	y
-7	6
-6	1
-5	-2
-4	
-3	
-2	
-1	

$$\begin{aligned}f(-5) &= (-5 + 4)^2 - 3 \\ &= (-1)^2 - 3 \\ &= 1 - 3 = -2\end{aligned}$$



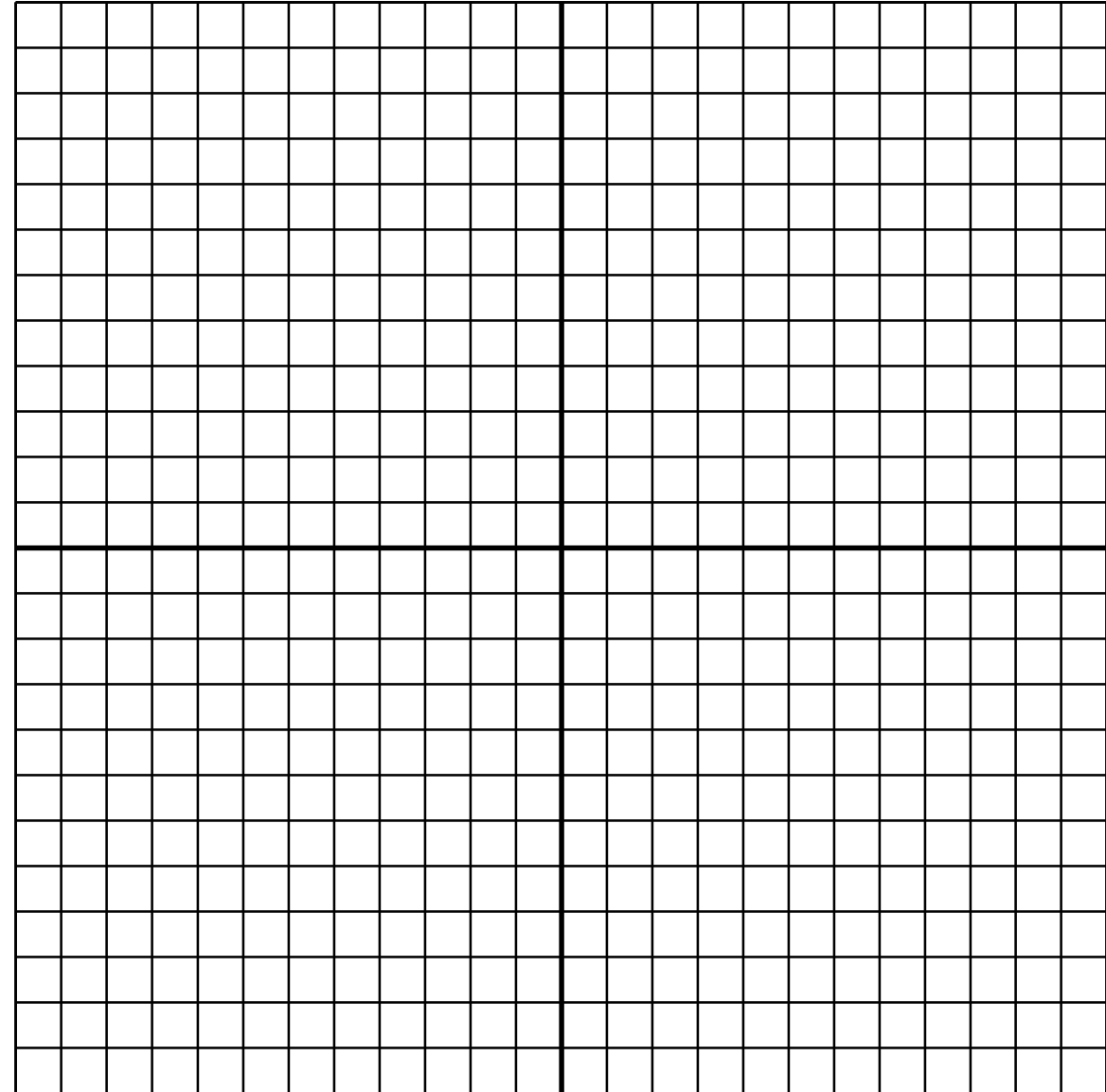
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x	y
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-6	1
-5	-2
-4	-3
-3	
-2	
-1	

$$\begin{aligned} f(-4) &= (-4 + 4)^2 - 3 \\ &= (0)^2 - 3 \\ &= 0 - 3 = -3 \end{aligned}$$



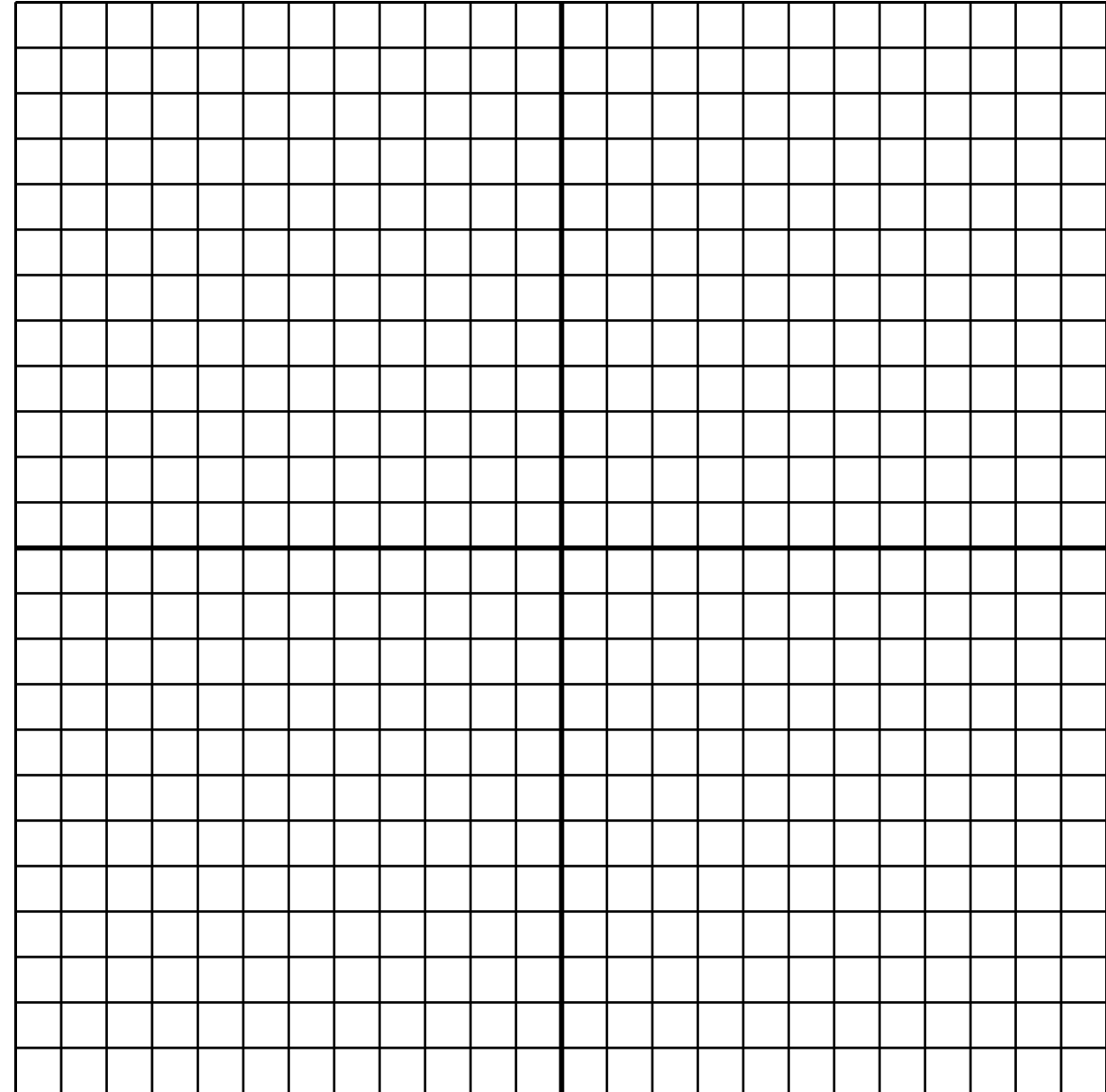
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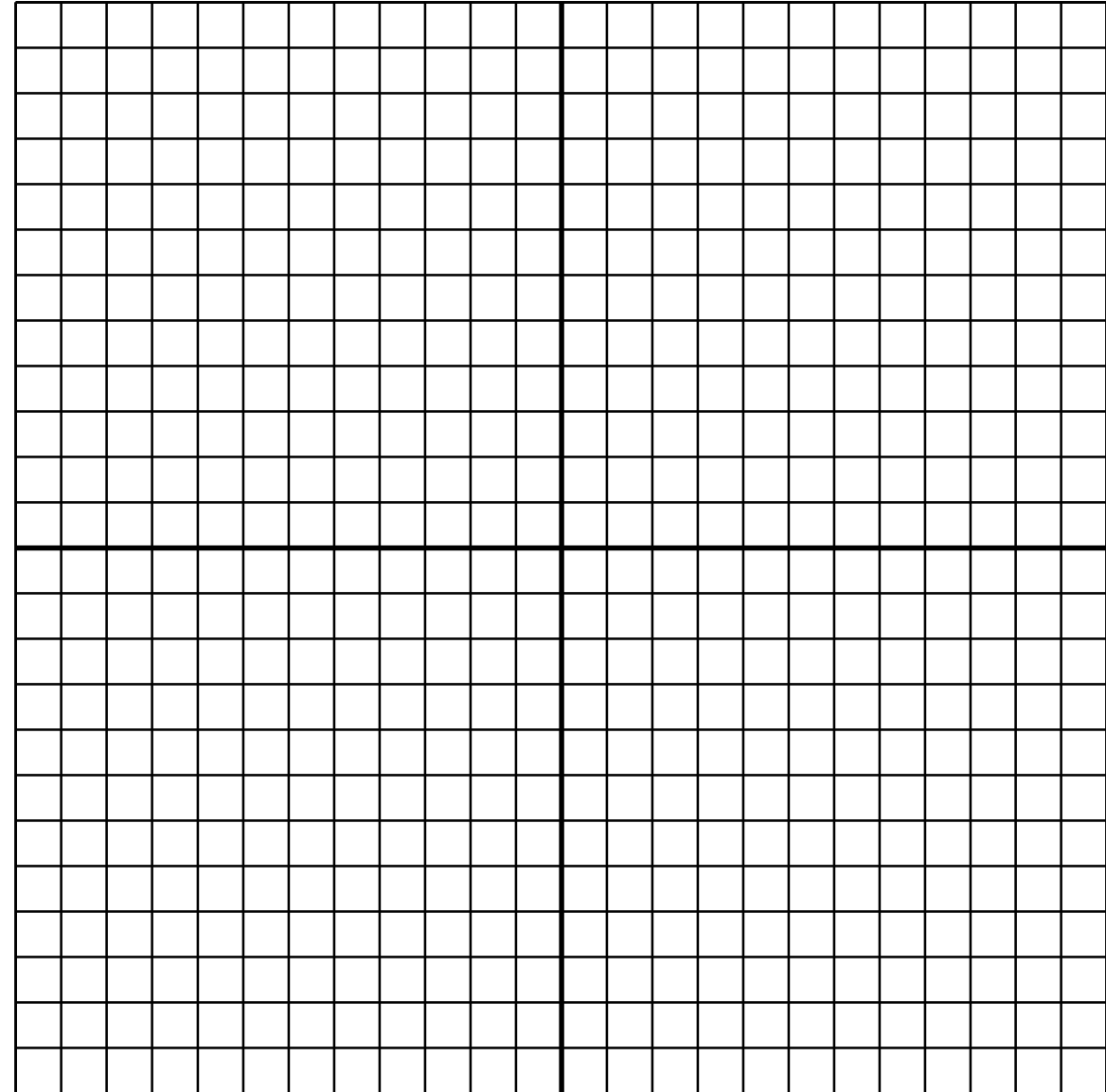
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-6	1
-5	-2
-4	-3
-3	-2
-2	1
-1	

$$\begin{aligned}f(-2) &= (-2 + 4)^2 - 3 \\ &= (2)^2 - 3 \\ &= 4 - 3 = 1\end{aligned}$$



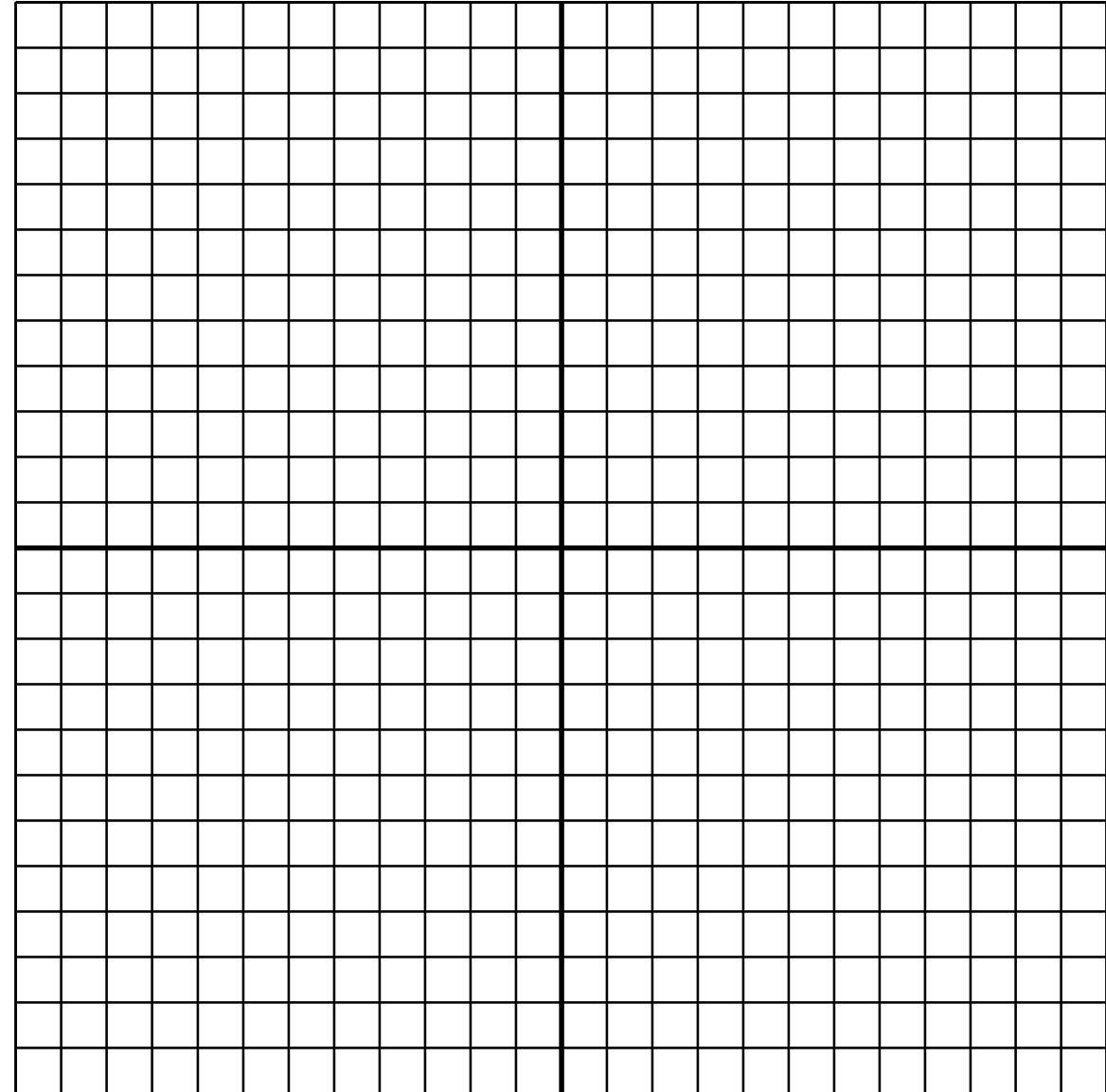
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x	y
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-6	1
-5	-2
-4	-3
-3	-2
-2	1
-1	6

$$\begin{aligned}f(-1) &= (-1 + 4)^2 - 3 \\ &= (3)^2 - 3 \\ &= 9 - 3 = 6\end{aligned}$$



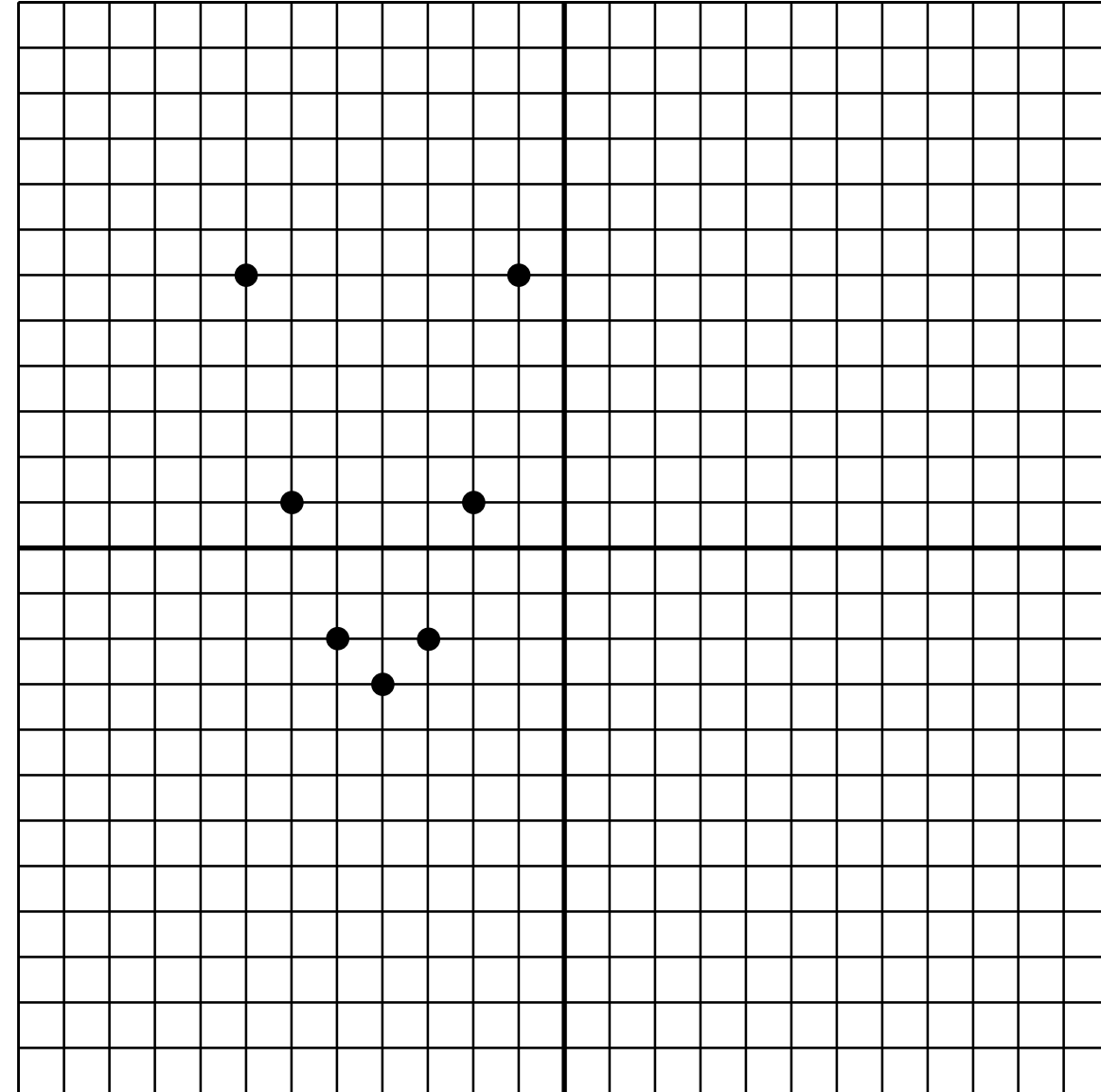
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-4	-3
-3	-2
-2	1
-1	6

Draw the points from the chart.



Graphing Quadratic Functions

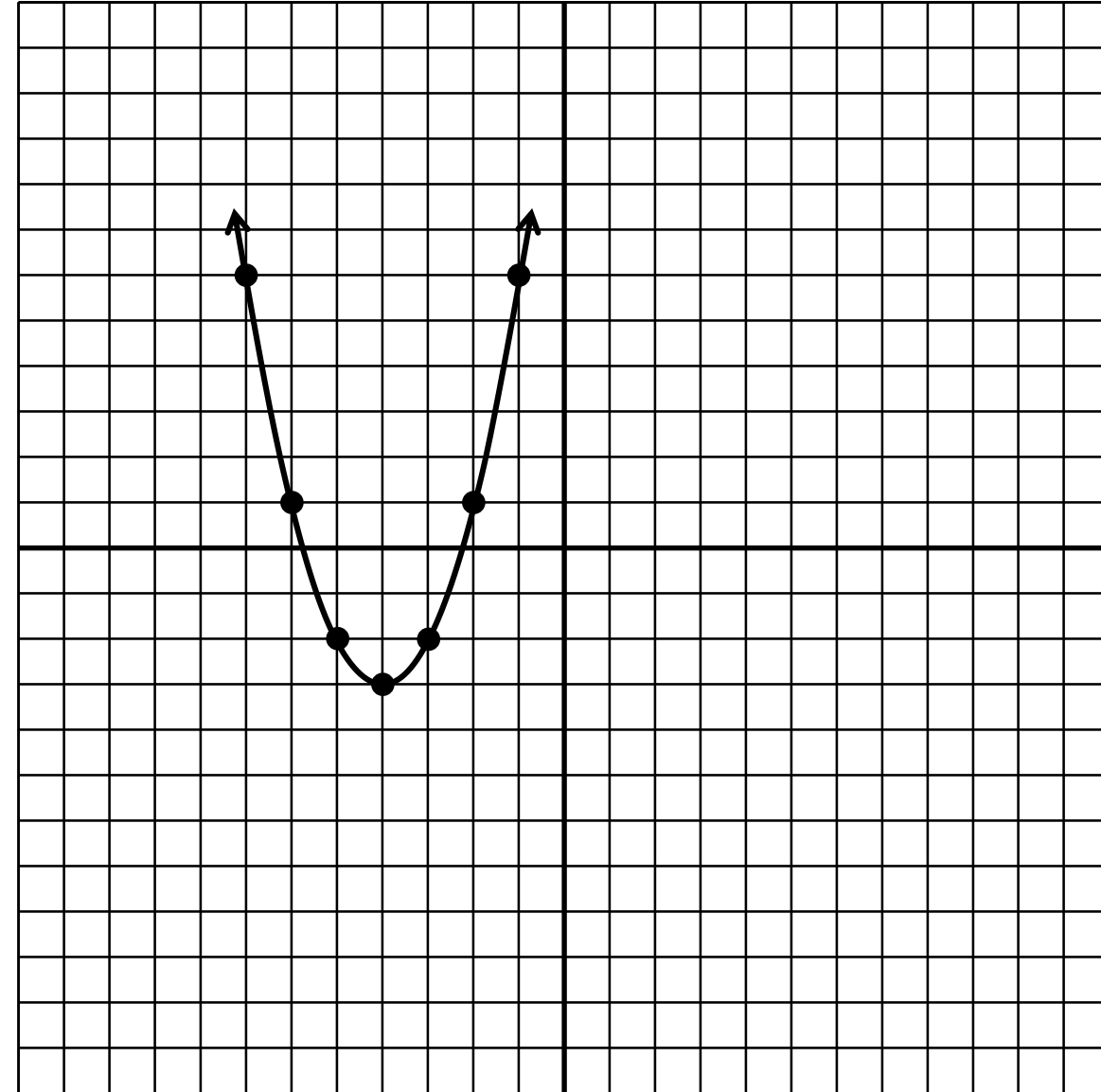
Graph the quadratic function.

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-2	1
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Connect the points.

It makes a parabola, a U-shaped (not V) geometric figure.



Graphing Quadratic Functions

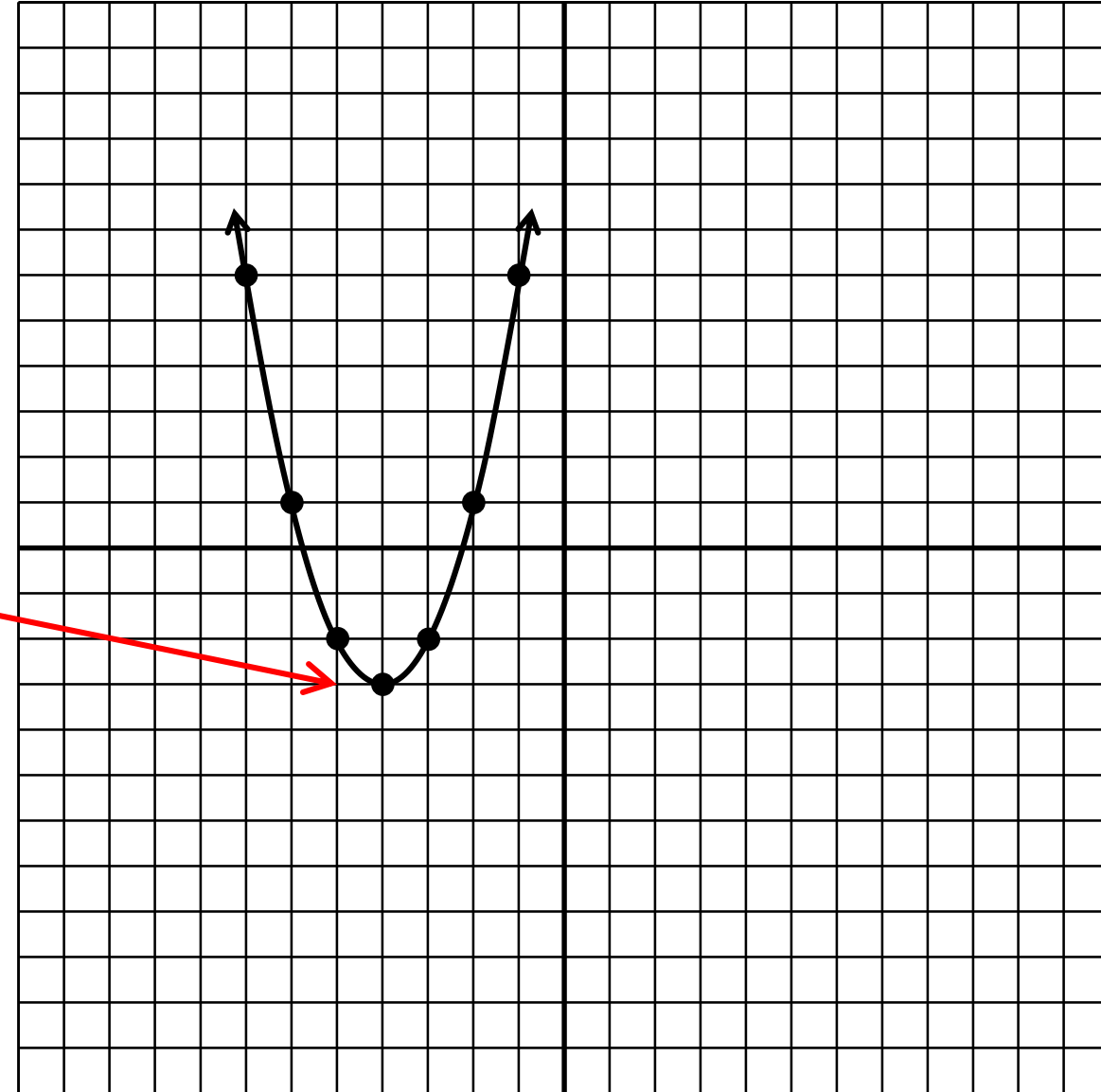
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-2	1
-1	6

The bottom point is called the vertex.

The parabola is round, not pointed, at the vertex.



Graphing Quadratic Functions

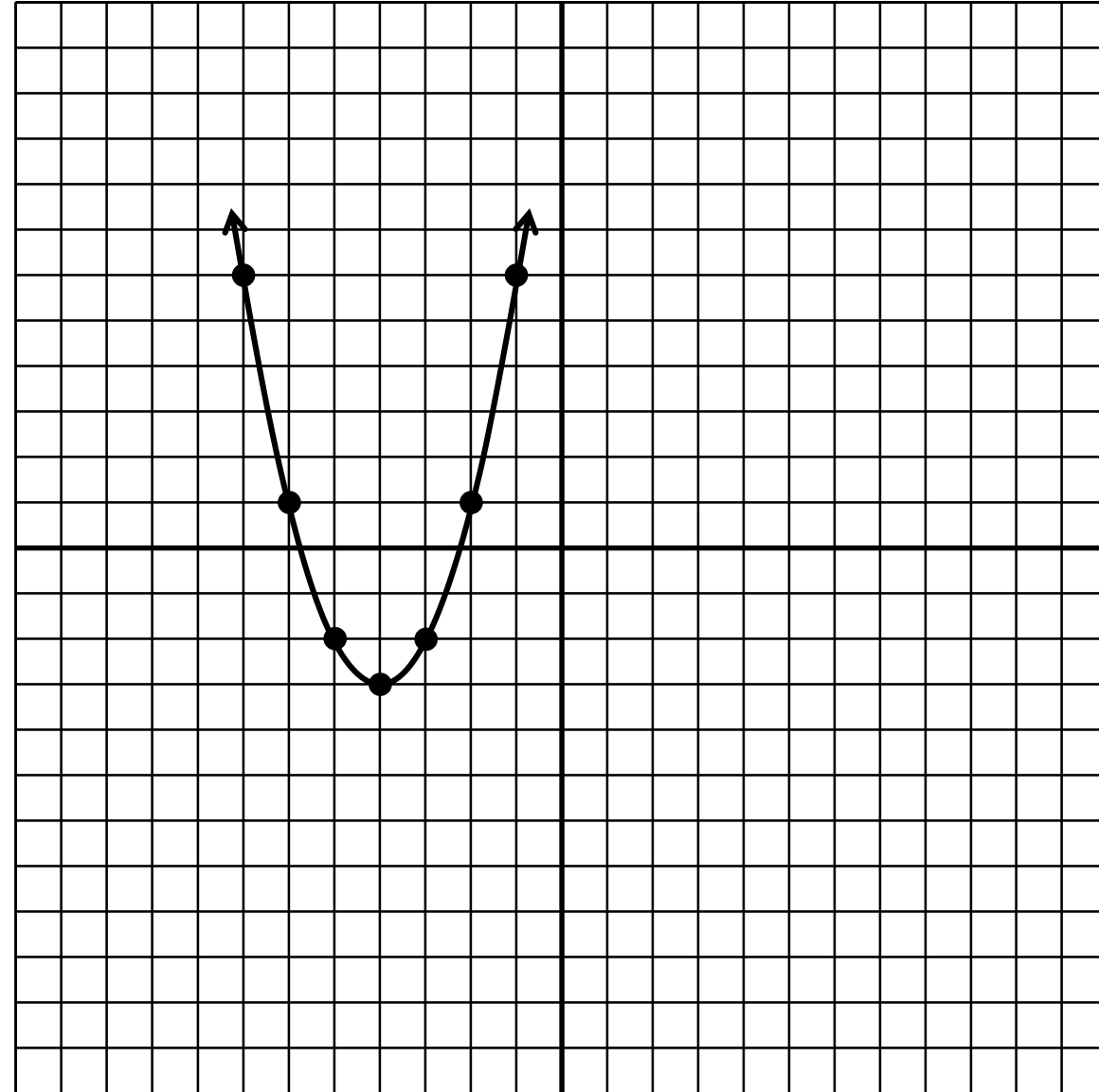
Graph the quadratic function.

1. $f(x) = (x + 4)^2 - 3$ Is there a way to find the vertex from the function easily?

x	y
-7	6
-6	1
-5	-2
-4	-3
-3	-2
-2	1
-1	6

← Vertex

Opposite inside,
same outside.



Graphing Quadratic Functions

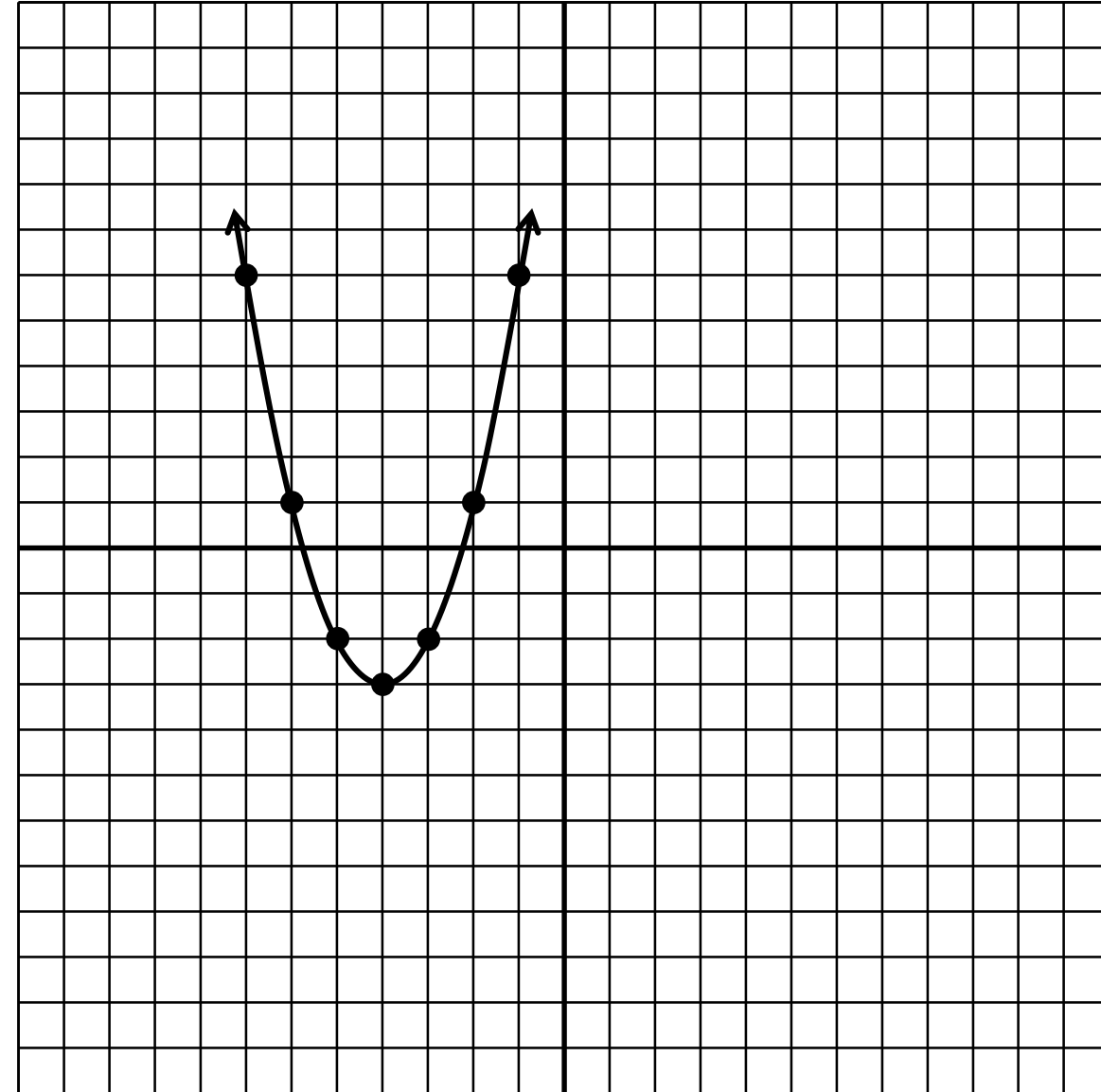
Graph the quadratic function.

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

x	y
-7	6
-6	1
-5	-2
-4	-3
-3	-2
-2	1
-1	6

The other points are in a pattern.

Find the pattern between the range values from the vertex.



Graphing Quadratic Functions

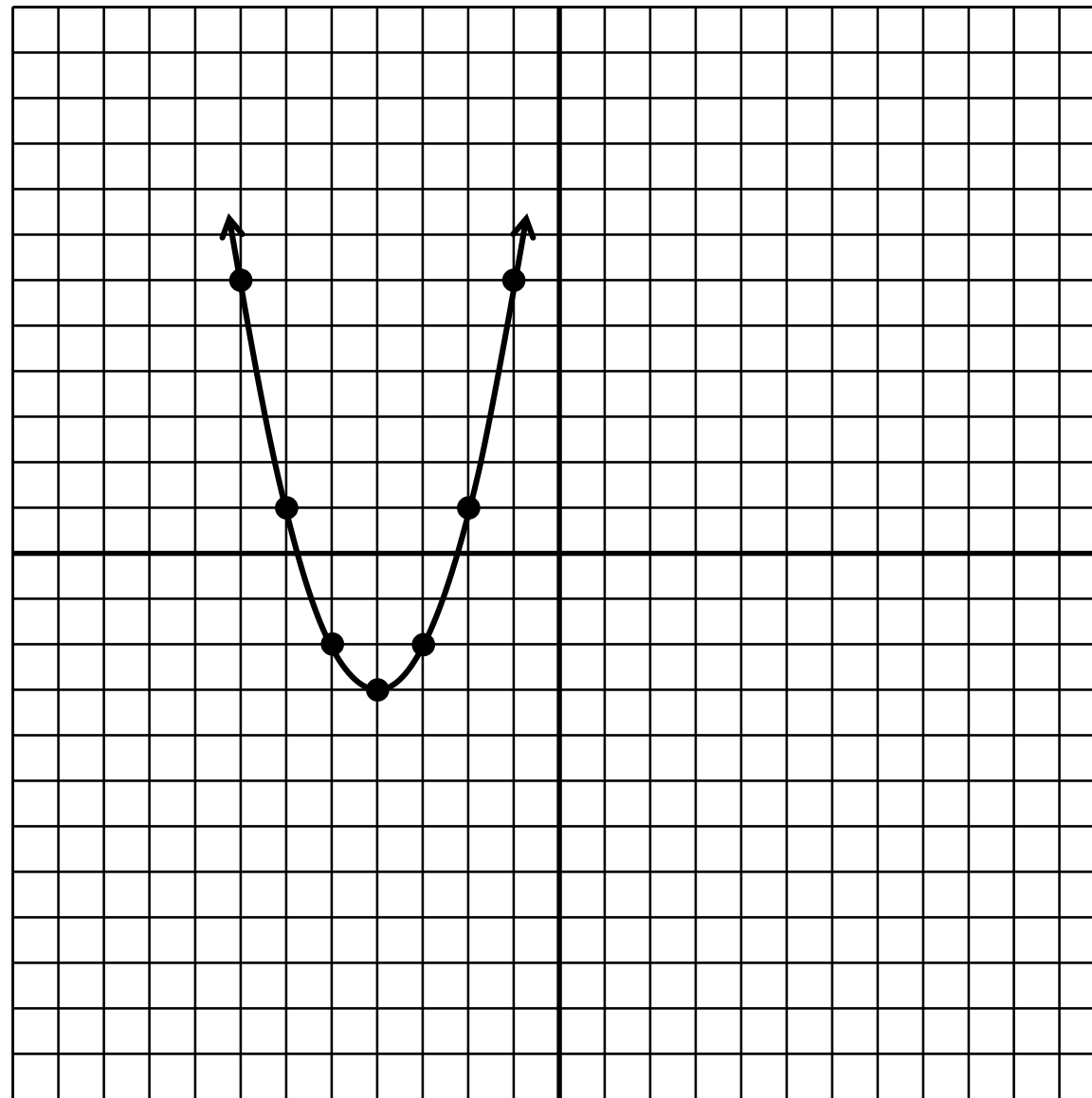
Graph the quadratic function.

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

From this pattern, we can find a chart to help graph.

x	y
-7	6
-6	1
-5	-2
-4	-3
-3	-2
-2	1
-1	6

+9
+4
+1
+1
+4
+9



Graphing Quadratic Functions

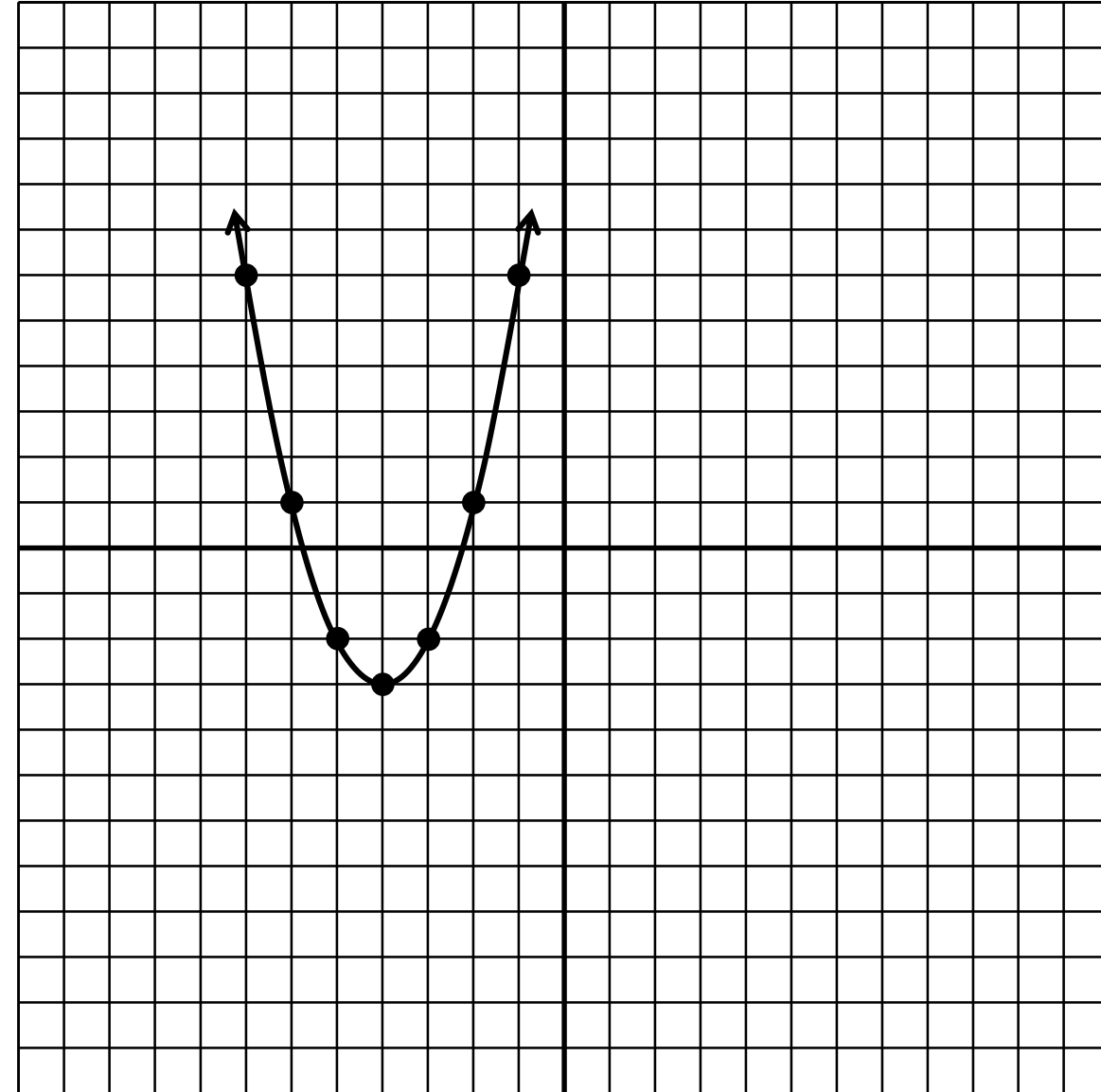
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x	y
-7	6
-6	1
-5	-2
-4	-3
-3	-2
-2	1
-1	6

<i>Left & Right</i>	<i>Up</i>
1	1
2	4
3	9

Is there a pattern? Yes, the up number is the square of the left/right number.



Graphing Quadratic Functions

Graph the quadratic function.

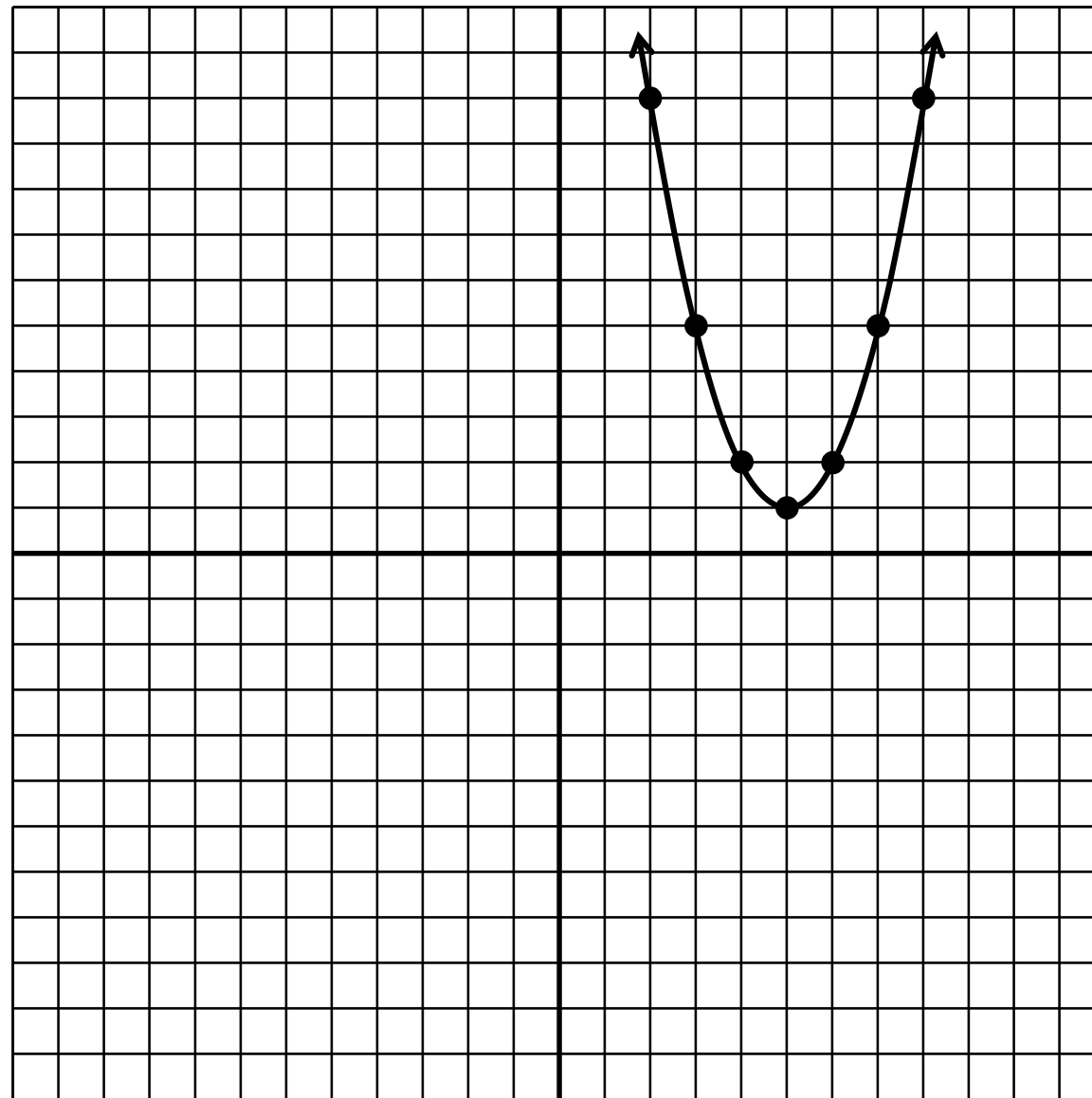
2. $f(x) = (x - 5)^2 + 1$

Find the vertex, then use the chart to graph the other points of the parabola.

Vertex: $(5, 1)$

Opposite inside, same outside.

<i>Left & Right</i>	<i>Up</i>
1	1
2	4
3	9



Graphing Quadratic Functions

Graph the quadratic function.

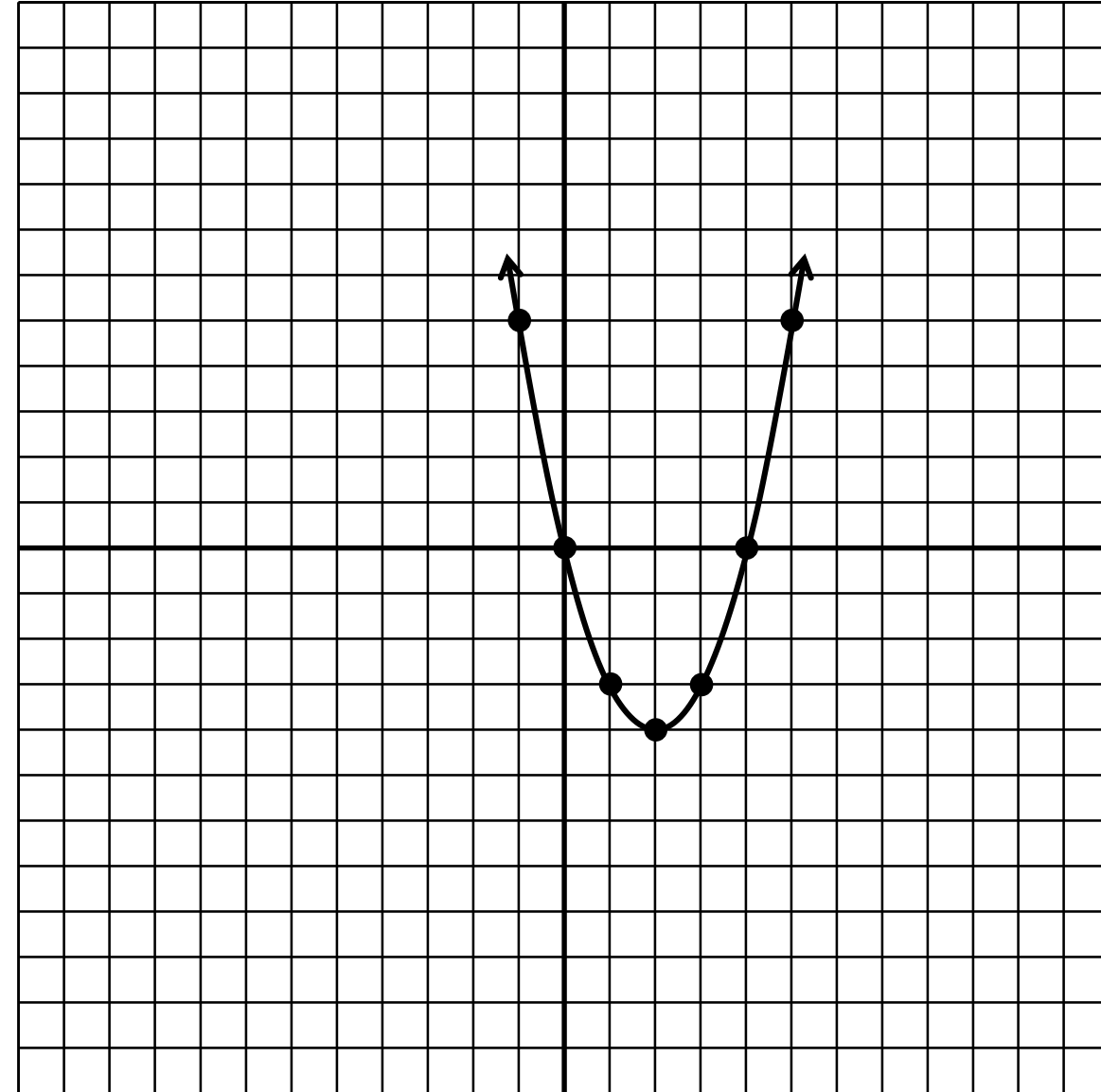
3. $f(x) = (x - 2)^2 - 4$

Find the vertex, then use the chart to graph the other points of the parabola.

Vertex: $(2, -4)$

Opposite inside, same outside.

<i>Left & Right</i>	<i>Up</i>
1	1
2	4
3	9



Graphing Quadratic Functions

Graph the quadratic function.

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

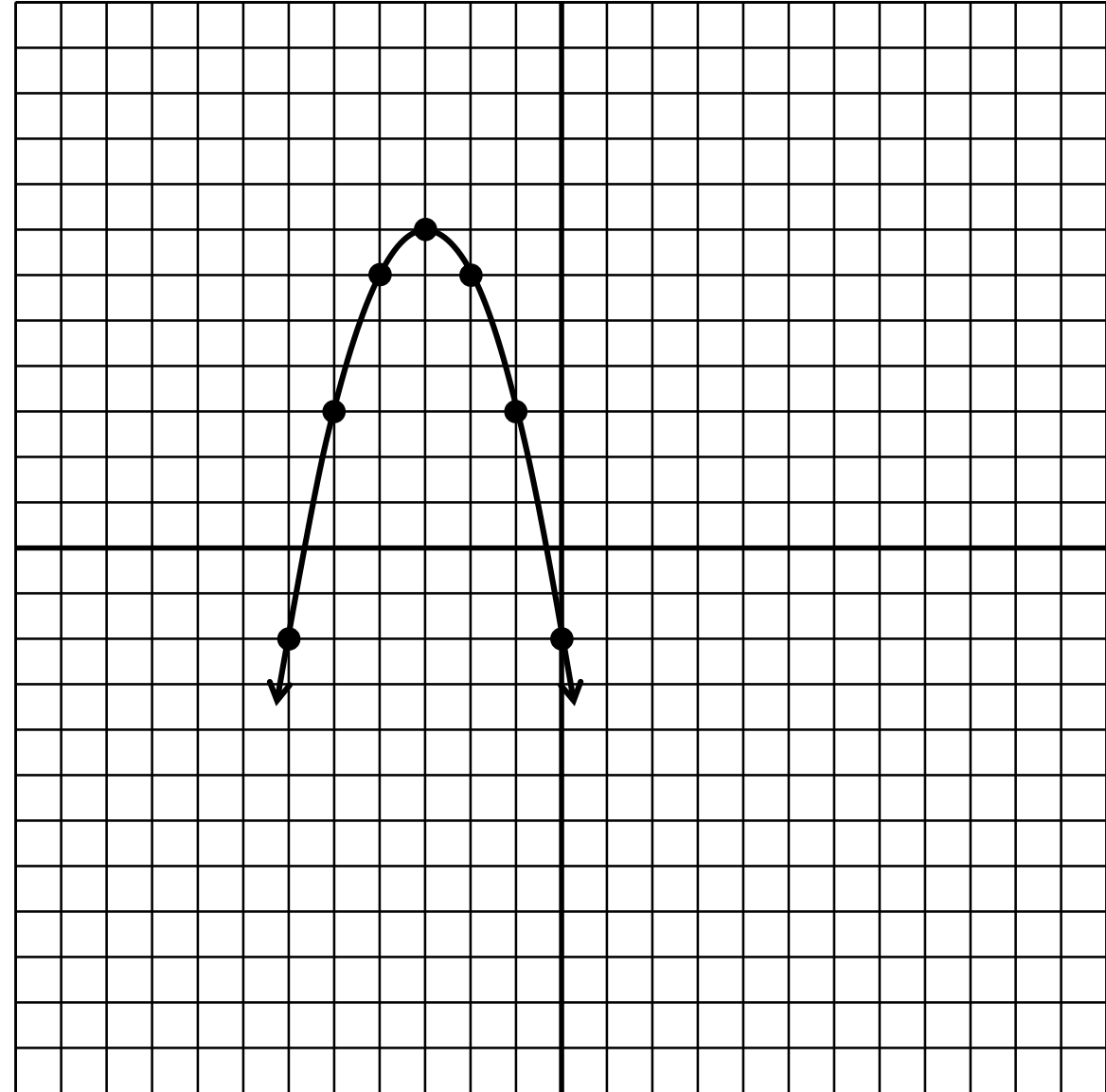
Find the vertex, then use the chart to graph the other points of the parabola.

<i>Left & Right</i>	<i>Up & Down</i>
1	1
2	4
3	9

Vertex: $(-3, 6)$

Opposite inside, same outside.

The negative in front tells us to go down, not up.



Graphing Quadratic Functions

Graph the quadratic function.

5. $f(x) = -(x - 5)^2 + 7$

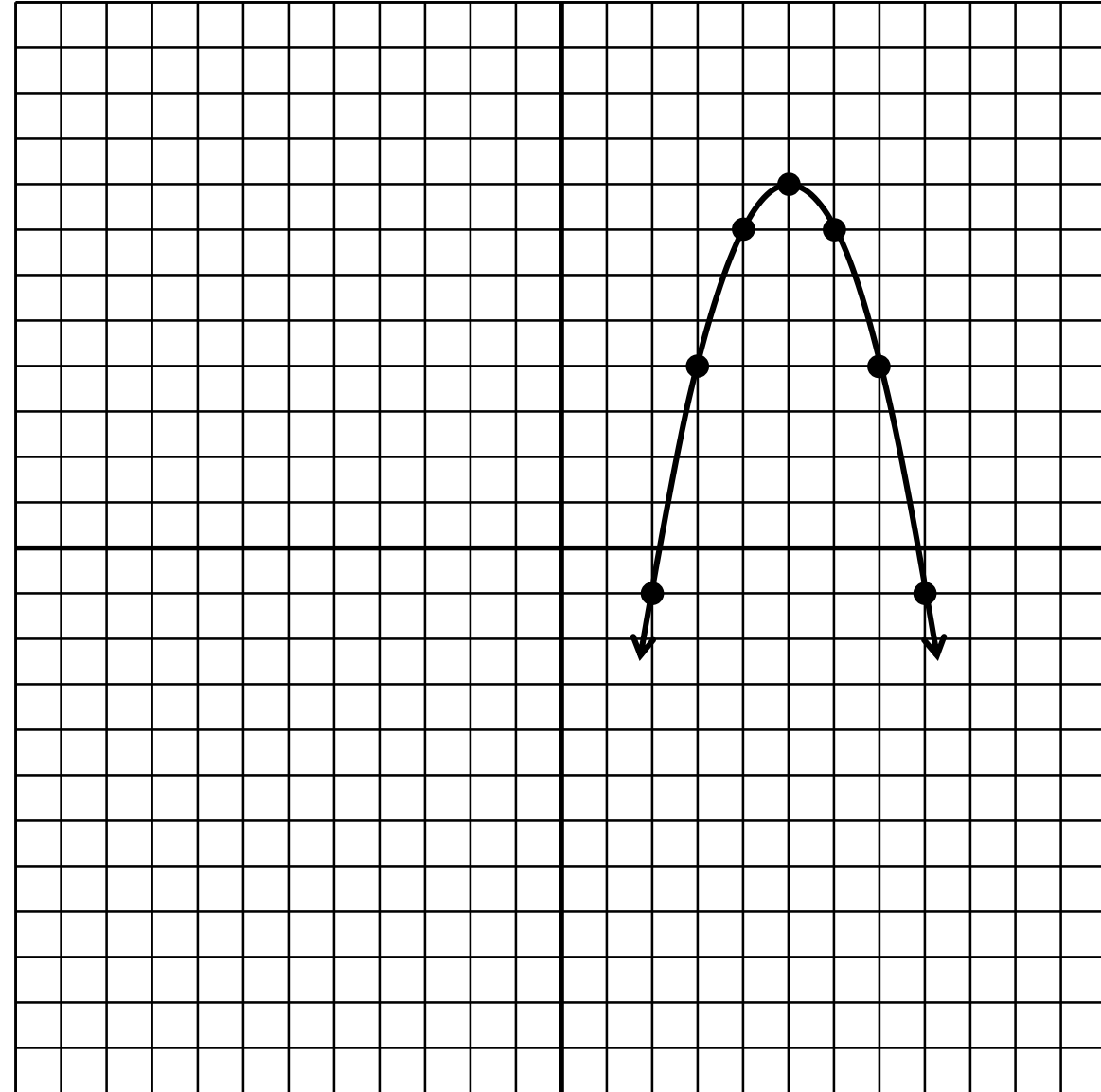
Find the vertex, then use the chart to graph the other points of the parabola.

<i>Left & Right</i>	<i>Up & Down</i>
1	1
2	4
3	9

Vertex: $(5, 7)$

Opposite inside, same outside.

The negative in front tells us to go down, not up.



Graphing Quadratic Functions

Graph the quadratic function.

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

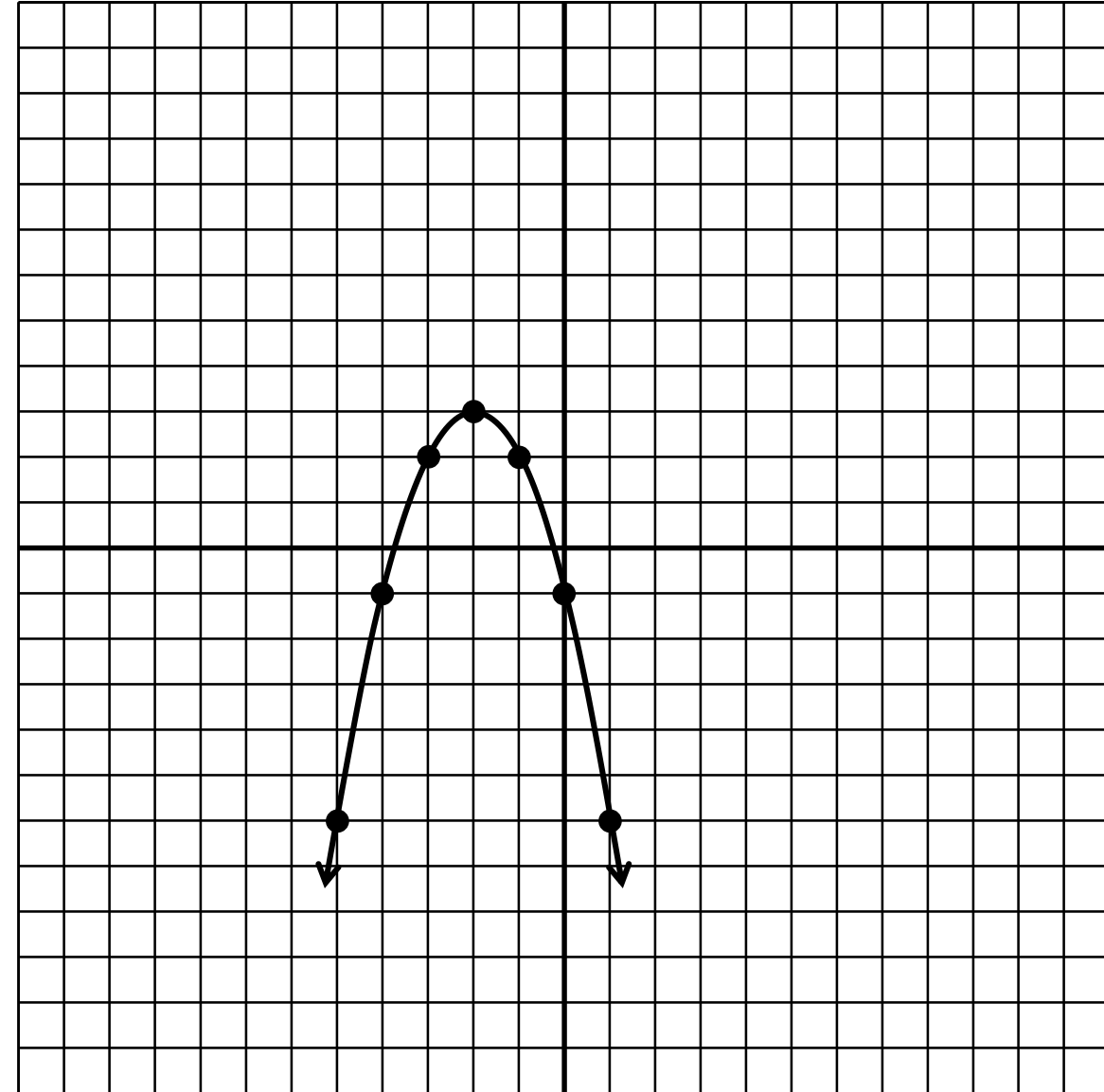
Find the vertex, then use the chart to graph the other points of the parabola.

<i>Left & Right</i>	<i>Up & Down</i>
1	1
2	4
3	9

Vertex: $(5, 7)$

Opposite inside, same outside.

The negative in front tells us to go down, not up.



Graphing Quadratic Functions

How do you find the vertex?

Opposite inside, same outside

What happens to the parabola if there is a negative in front?

It goes down.

What is the chart to use to graph the other points.

<i>Left & Right</i>	<i>Up & Down</i>
1	1
2	4
3	9

Graphing Quadratic Functions

Assignment:

Fluency Practice: Graphing Quadratic Functions in Vertex Form Worksheet