Warm-Up (EOC-Type Questions)
3/22/2021

1. The formula $a = \frac{1}{2}rp$ describes the relationship of the area of a regular polygon, a, to the length of its apothem, r, and perimeter, p. Which describes the relationship of the apothem of a regular polygon to its area and perimeter?

A. $r = \frac{1}{2}ap$

B. $r = \frac{a}{2p}$

C. $r = 2ap$

D. $r = \frac{2a}{p}$

Literal Equation.

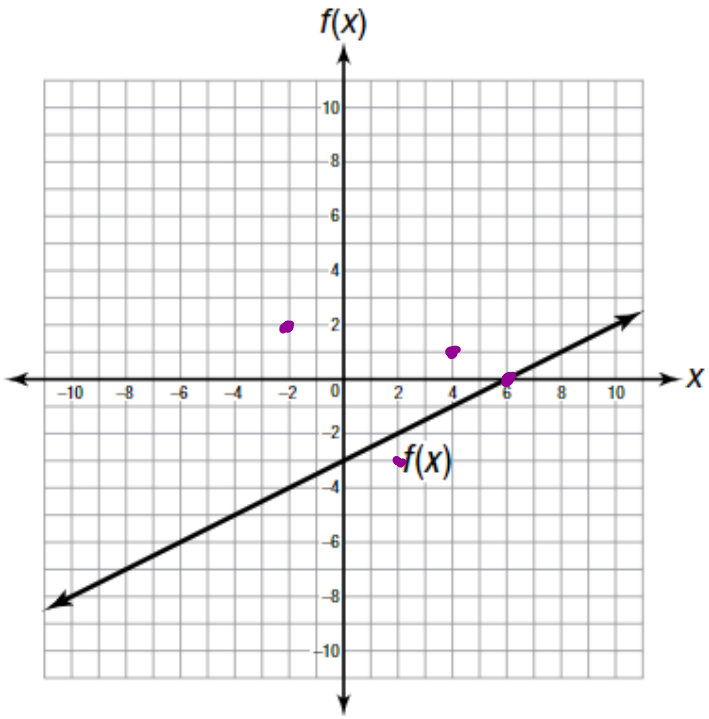
$(2)\, a = (2)\frac{1}{2}rp$

$\frac{2a}{p} = \frac{rp}{p}$

$r = \frac{2a}{p}$

2.

Which ordered pair represents a solution to the function graphed below?



A. (6, 0)

B. (−2, 2)

C. (4, 1)

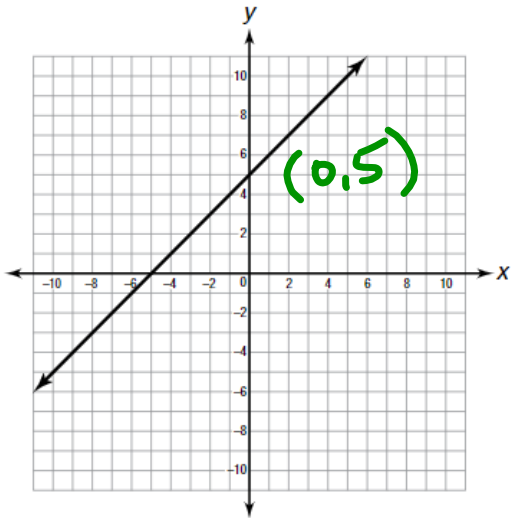
D. (2, −3)

Unit 2

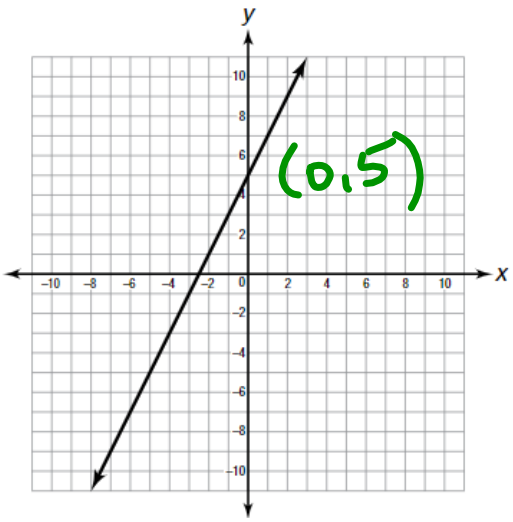
Which of the following shows a linear function that does not have the same y-intercept as each of the other linear functions shown?

3.

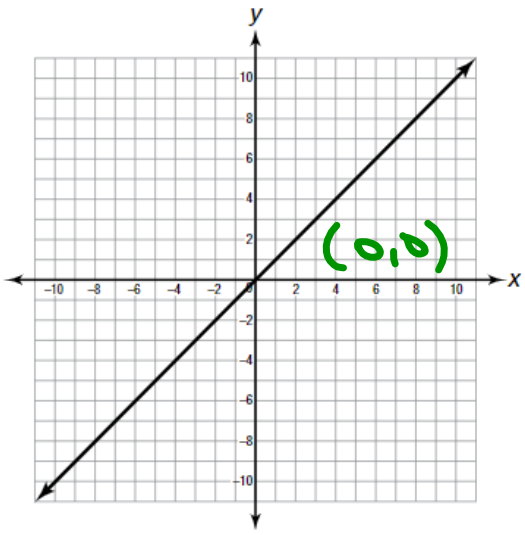
A.



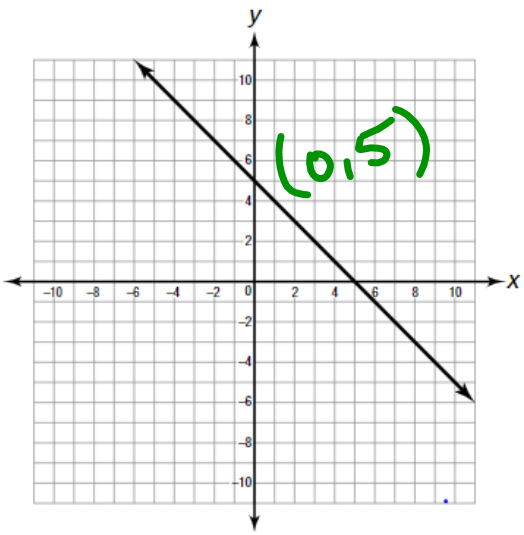
C.



B.



D.



Warm-Up 3/23/2021

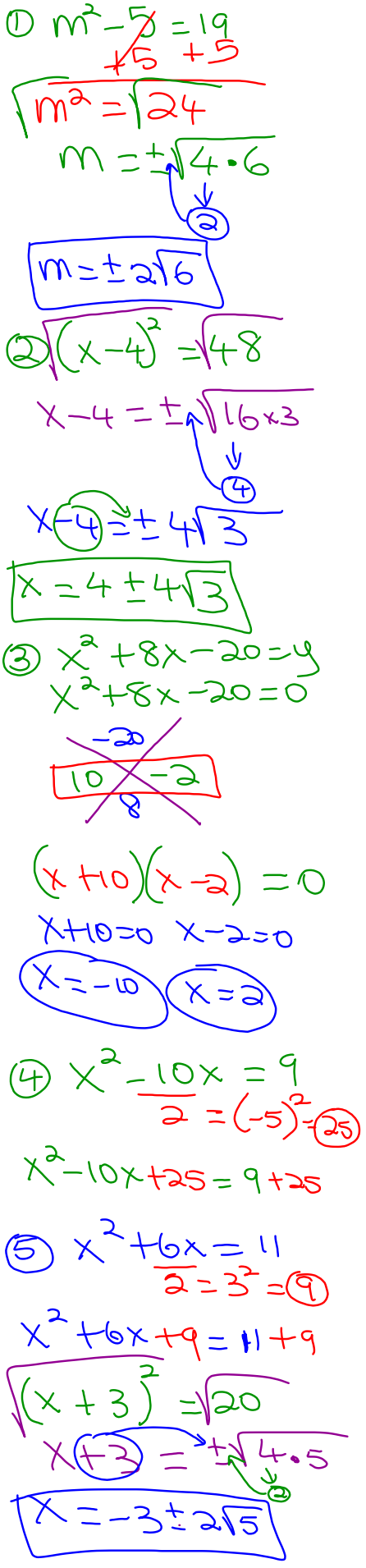
1. $m^2 - 5 = 19$ Solve for m.

2. $(x - 4)^2 = 48$ Solve for x.

3. Find the zeros: $x^2 + 8x - 20 = y$

4. What value must be added to the equation to complete the square in the quadratic equation $x^2 - 10x = 9$

5. Solve the equation by completing the square. $x^2 + 6x = 11$


① $m^2 - 5 = 19$
$+5 \quad +5$
$\sqrt{m^2} = \sqrt{24}$
$m = \pm\sqrt{4 \cdot 6}$
2
$m = \pm 2\sqrt{6}$
② $\sqrt{(x-4)^2} = \sqrt{48}$
$x - 4 = \pm\sqrt{16 \times 3}$
4
$x - 4 = \pm 4\sqrt{3}$
$x = 4 \pm 4\sqrt{3}$
③ $x^2 + 8x - 20 = 4$
$x^2 + 8x - 20 = 0$
-20
$10 \quad -2$
8
$(x+10)(x-2) = 0$
$x+10=0 \quad x-2=0$
$x = -10 \quad x = 2$
④ $x^2 - 10x = 9$
$\frac{-10}{2} = (-5)^2 = 25$
$x^2 - 10x + 25 = 9 + 25$
⑤ $x^2 + 6x = 11$
$\frac{6}{2} = 3^2 = 9$
$x^2 + 6x + 9 = 11 + 9$
$\sqrt{(x+3)^2} = \sqrt{20}$
$x + 3 = \pm\sqrt{4 \cdot 5}$
2
$x = -3 \pm 2\sqrt{5}$

6. Solve for x in the equation using the quadratic formula and explain how you got your solution.

$6x^2 + 17x - 6 = -11$

$+11 \quad +11$

$6x^2 + 17x + 5 = 0$ $a=6\ b=17\ c=5$

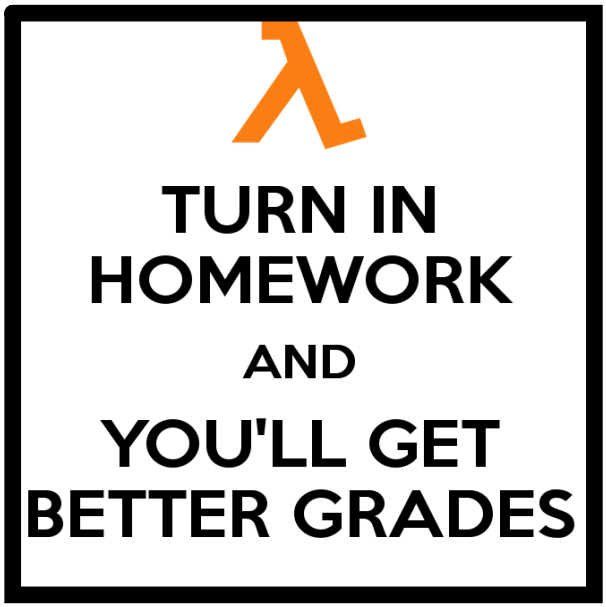
$x = \frac{-b \pm \sqrt{b^2 - 4ac}}{2a}$

$x = \frac{-17 \pm \sqrt{17^2 - (4 \cdot 6 \cdot 5)}}{2(6)}$ — calculator

$x = \frac{-17 \pm 13}{12}$

$x = \frac{-17+13}{12}$ and $\frac{-17-13}{12}$

$x = -\frac{1}{3}$ and $-\frac{5}{2}$



Do your missing tests/ Remediation tests!

Remember to do deltamath on assignments that you have zeros or a failing grade!!!

Essential Question 3/22/2021

How can I graph a Quadratic function from the standard form of the equation?

Learning Target

Graph quadratic functions in standard form ax^2+bx+c

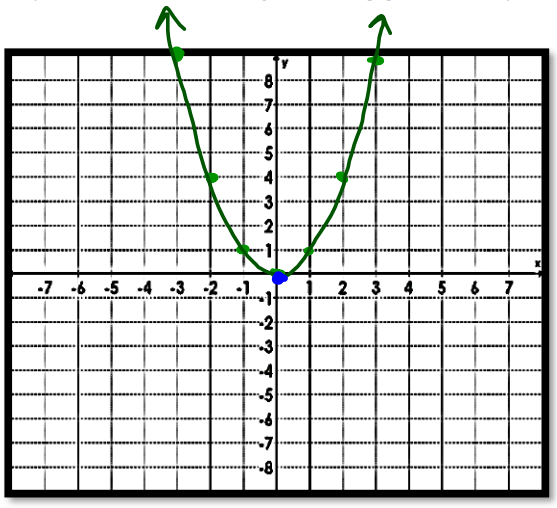
Graphing in Standard Form

Standard(s): MGSE9-12.F.IF.7 Graph functions expressed algebraically and show key features of the graph both by hand and by using technology.

The **parent function** of a function is the simplest form of a function.

The parent function for a quadratic function is $y = x^2$ or $f(x) = x^2$. Graph the parent function below.

x	x^2
-3	9
-2	4
-1	1
0	0
1	1
2	4
3	9



The U-shaped graph of a quadratic function is called a parabola.

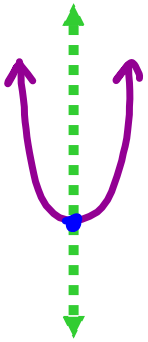
The highest or lowest point on a parabola is called the vertex.

One other characteristic of a quadratic equation is that one of the terms is always squared.

Graphing in Standard Form

Standard Form of a Quadratic Function:

$y = ax^2 + bx + c$



The axis of symmetry is $x = \frac{-b}{2a}$.

The Vertex is on the axis of symmetry line. Look for that x-value in your table.

The a-value determines whether your graph "goes up" on both sides or "goes down" on both sides of your vertex.

- opens up: a-value is positive (looks like a "U")
- opens down: a-value is negative (looks like an "∩")

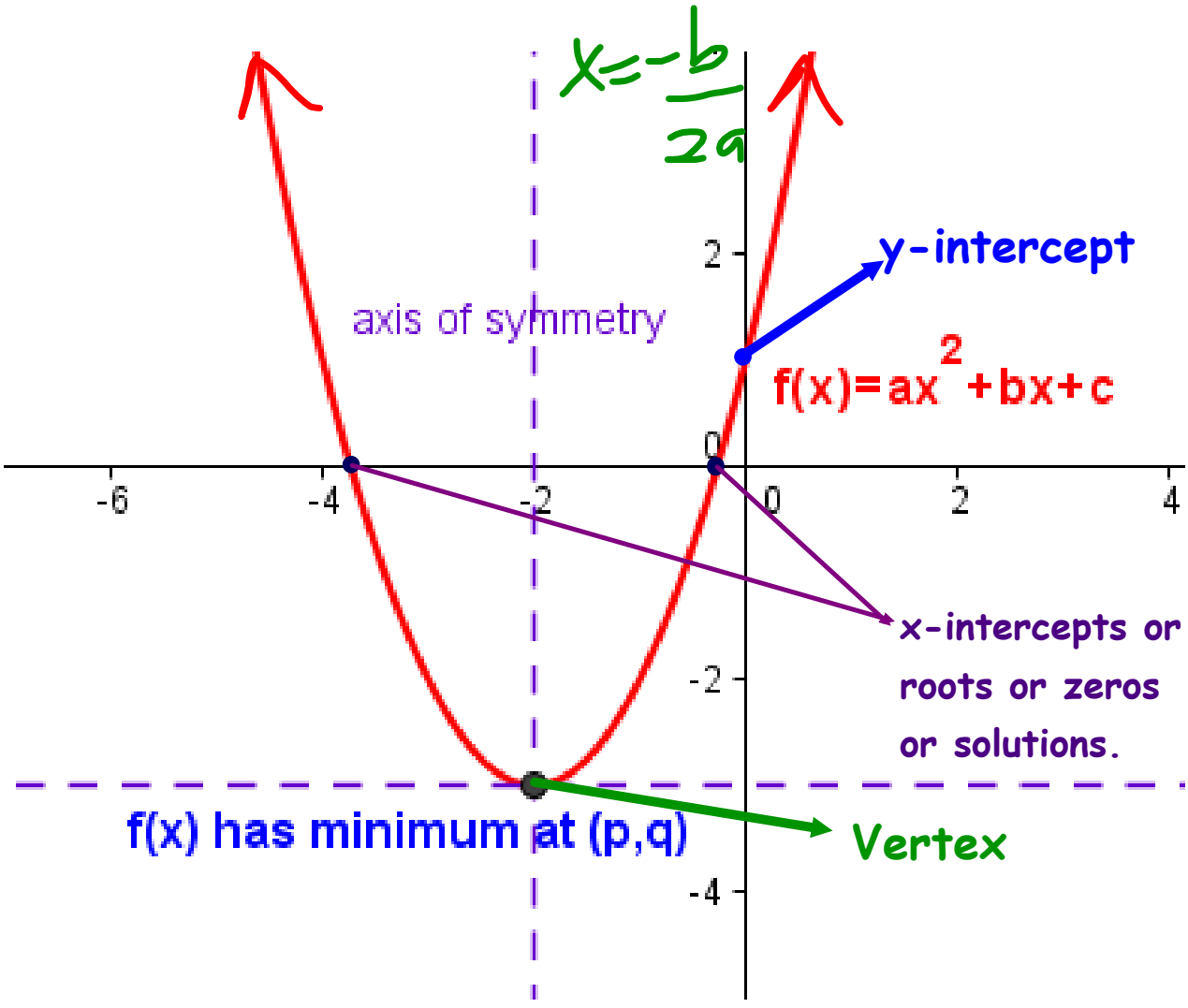
The Solutions / Zeros / X-intercepts / roots are where $y = 0$.

You can either solve the equation $0 = ax^2 + bx + c$, to find the roots or look for where $y = 0$ in your table.

The y-intercept is where $x = 0$. This will be the point $(0, c)$.

A good PARABOLA has at least five points. Make a table of values with your vertex in the middle and plot them to make a good graph.

Features of a Parabola



Steps for Graphing in Standard Form

1) Find the vertex.

- Use $x = \frac{-b}{2a}$ to find our x- coordinate of our vertex
- Substitute that x back into our equation, and our solution is the y-coordinate of our vertex.

2) Use your vertex as the center for your table and determine two x values to the left and right of your x-coordinate and substitute those x values back into the equation to determine the y values.

3) Plot your points and connect them from left to right! Your table MUST have 5 points!

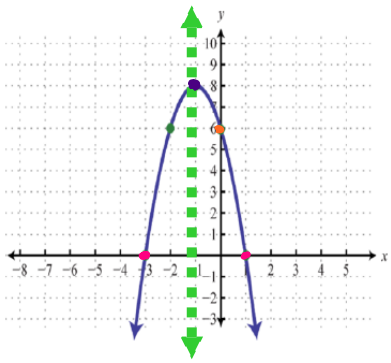
Example: Graph $y = -2x^2 - 4x + 6$

$a = -2 \quad b = -4 \quad c = 6$

$$x = \frac{-b}{2a} = \frac{-(-4)}{2(-2)} = \frac{4}{-4} = -1$$

$$y = -2(-1)^2 - 4(-1) + 6 = 8$$

X	Y
-3	0
-2	6
-1	8
0	6
1	0



This parabola has an axis of symmetry at $x = -1$, a vertex at $(-1,8)$ which is also considered a maximum a y-intercept at $(0,6)$, and x-intercepts at $(-3,0)$ and $(1,0)$.

Practice with Graphing in Standard Form - I do

Example 1: Graph $y = x^2 - 2x - 3$

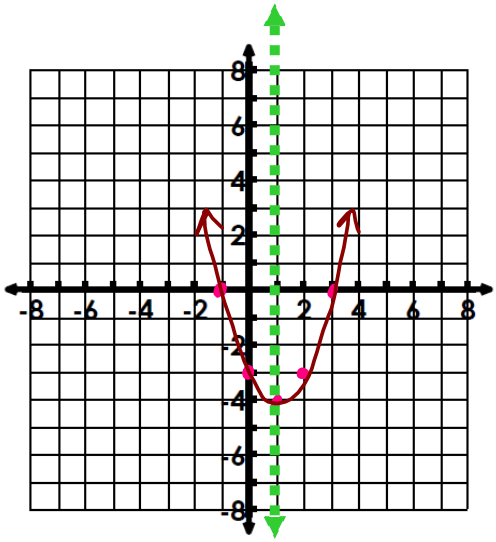
a = 1 b = -2 c = -3

Vertex? (1 , -4)

$x = \frac{-b}{2a} = \frac{-(-2)}{2(1)} = 1$

$f(1) = (1)^2 - 2(1) - 3 = -4$

x	y
-1	0
0	-3
1	-4
2	-3
3	0



Y-Intercept? (0, -3)

X-Intercepts? (-1, 0), (3, 0)

Up or Down?

Maximum or Minimum? $y = -4$

Practice with Graphing in Standard Form - We do

ax^2+bx+c

Example 2: Graph: $y = 3x^2 - 6x$.

a = 3 b = −6 c = 0

Vertex? (1 , −3)

$x = \frac{-b}{2a} = \frac{-(-6)}{2(3)} = 1$

$f(1) = 3(1)^2 - 6(1) = -3$

x	y
−1	9
0	0
1	−3
2	0
3	9

V

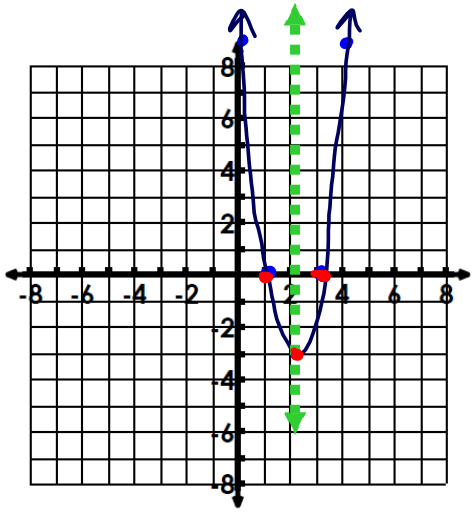
Y-Intercept? (0,0)

X-Intercepts? (0,0), (2,0)

Up or Down? Up

Maximum or Minimum? Minimum

$y = -3$



Practice with Graphing in Standard Form - You do

Example 3: Graph $y = 2x^2 + 3$.

a = 2 b = 0 c = 3

Vertex? (0 , 3)

$x = \frac{-b}{2a} = \frac{-0}{2(2)} = 0$

$f(0) = 2(0)^2 + 3 = 3$

Y-Intercept? (0,3)

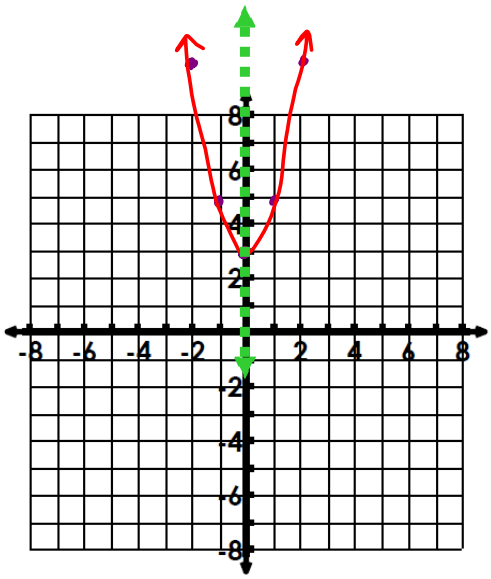
X-Intercepts? none

Up or Down?

Maximum or Minimum?

$y = 3$

x	y
-2	11
-1	5
0	3
1	5
2	11



Practice with Graphing in Standard Form - You do

Example 4: Graph: $y = -x^2 + 6x - 9$

$a = -1$ $b = 6$ $c = -9$

Vertex? (3 , 0)

$x = \frac{-b}{2a} = \frac{-6}{2(-1)} = 3$

$f(3) = -(3)^2 + 6(3) - 9 = 0$

Y-Intercept? $(0, -9)$

X-Intercepts? $(3, 0)$

Up or Down? a is negative

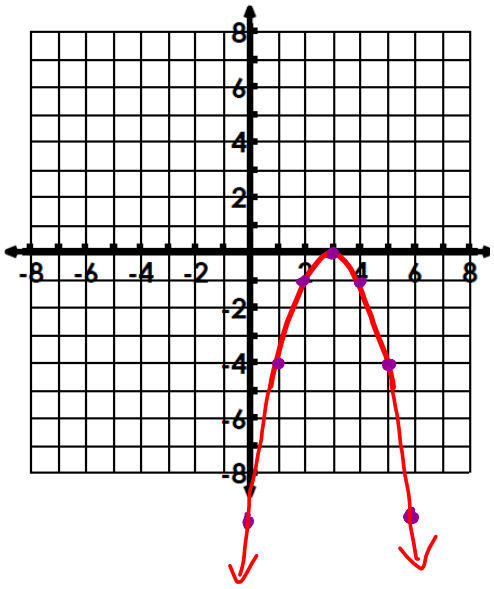
Maximum or Minimum?

$y = 0$

0 −9

x	y
1	−4
2	−1
3	0
4	−1
5	−4

6 −9



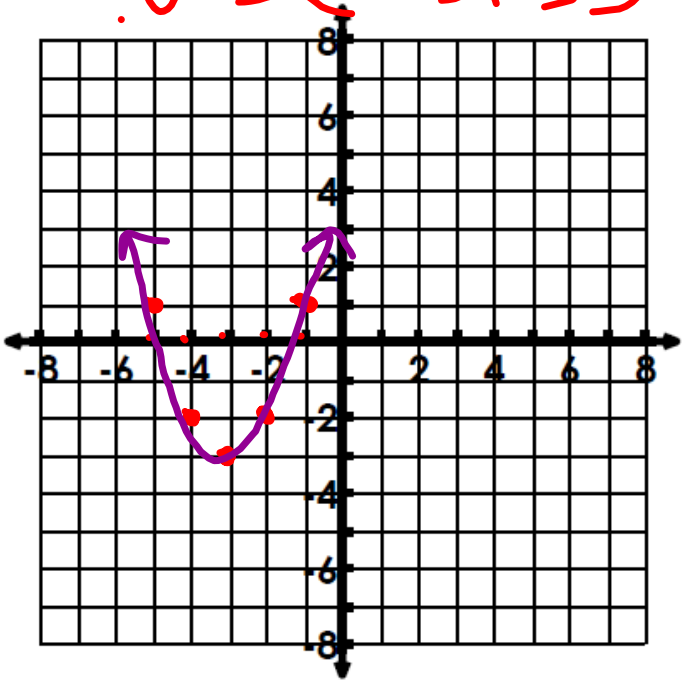
Quick Check - 1

Graph the quadratic function. You must show how you calculated the vertex and show a table with 5 ordered pairs.

$$y = x^2 + 6x + 6$$

$V = (-3, -3)$

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



$a=1 \quad b=6 \quad c=6$

$$x=\frac{-b}{2a}=\frac{-6}{2(1)}=-3$$

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

$$f(-3)=-3$$

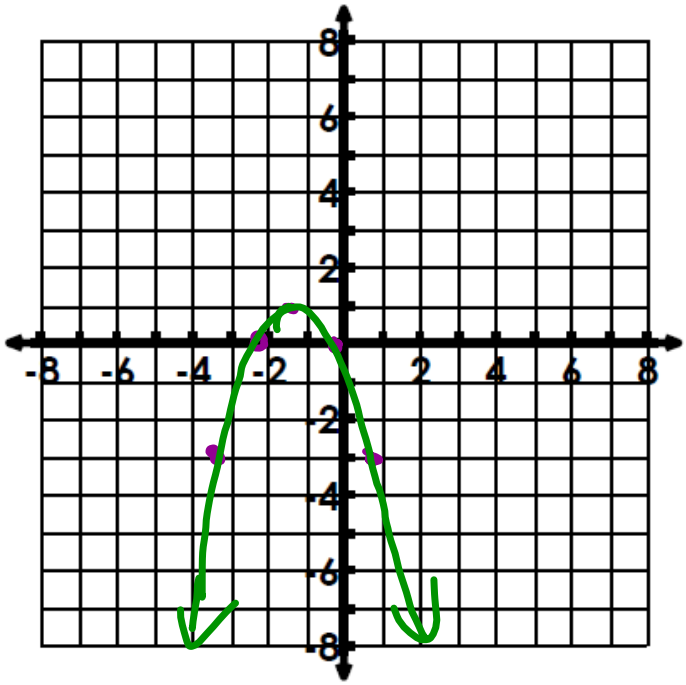
$$x=\frac{-b}{2a}$$

Quick Check - 2

Graph the quadratic function. You must show how you calculated the vertex and show a table with 5 ordered pairs.

$$y = -x^2 - 4x - 3$$

x	y
-4	-3
-3	0
-2	1
-1	0
0	-3



$a = -1 \quad b = -4$

$$x = \frac{-b}{2a} = \frac{-(-4)}{2(-1)} = -2$$

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

$$f(-2) = 1$$

$$V = (-2, 1)$$

Closing (EOC Type Question)

Which describes all of the *x*- and *y*-intercepts of the function below?

$f(x) = -\frac{1}{4}(x + 8)^2$

A. (−16, 0), (0, 8), and (16, 0)

B. (0, −16), (0, 16), and (8, 0)

C. (−8, 0) and (0, −16)

D. (0, −2) and (0, 2)

X-intercept – value of x when y = 0

$-\frac{1}{4}(x+8)^2 = 0 \quad (4)$

$-1(x+8)^2 = 0$

$\frac{-1(x+8)}{-1} = \frac{0}{-1}$

$x + 8 = 0$

$-8 \quad -8$

$x = -8$

So, x-int = (−8, 0)

y-int: the value of y when x = 0

So $f(0) = -\frac{1}{4}(0+8)^2$

$f(0) = -\frac{1}{4}(8)^2$

$f(0) = -\frac{1}{4}(64)$

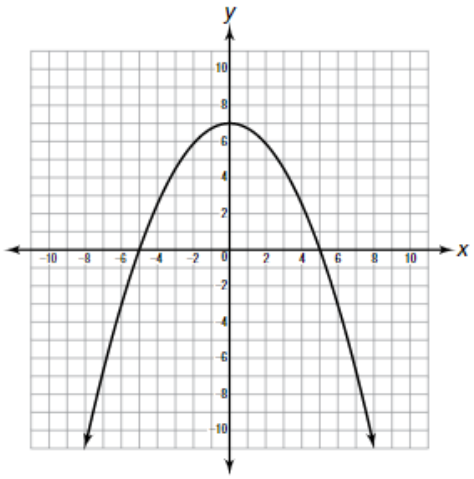
$f(0) = -16$

y-int: (0, −16)

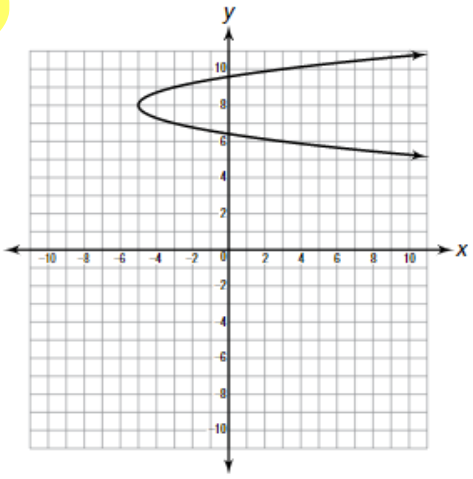
Closing (EOC Type Question)

Which of the following graphs displays a quadratic relation that is **not** a function?

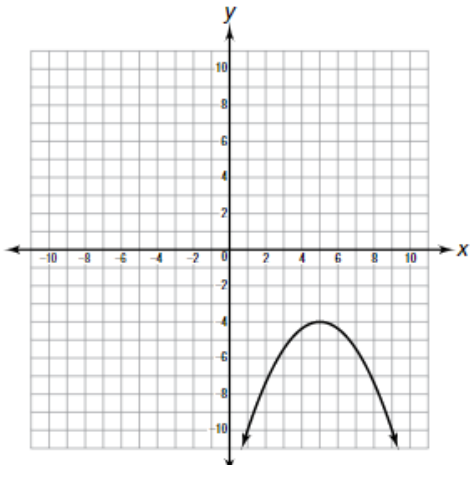
A.



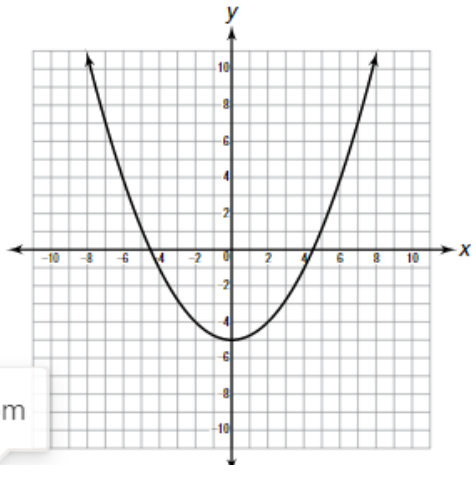
C.



B.



D.



Zoom