

#1D Pre-Calculus Worksheet

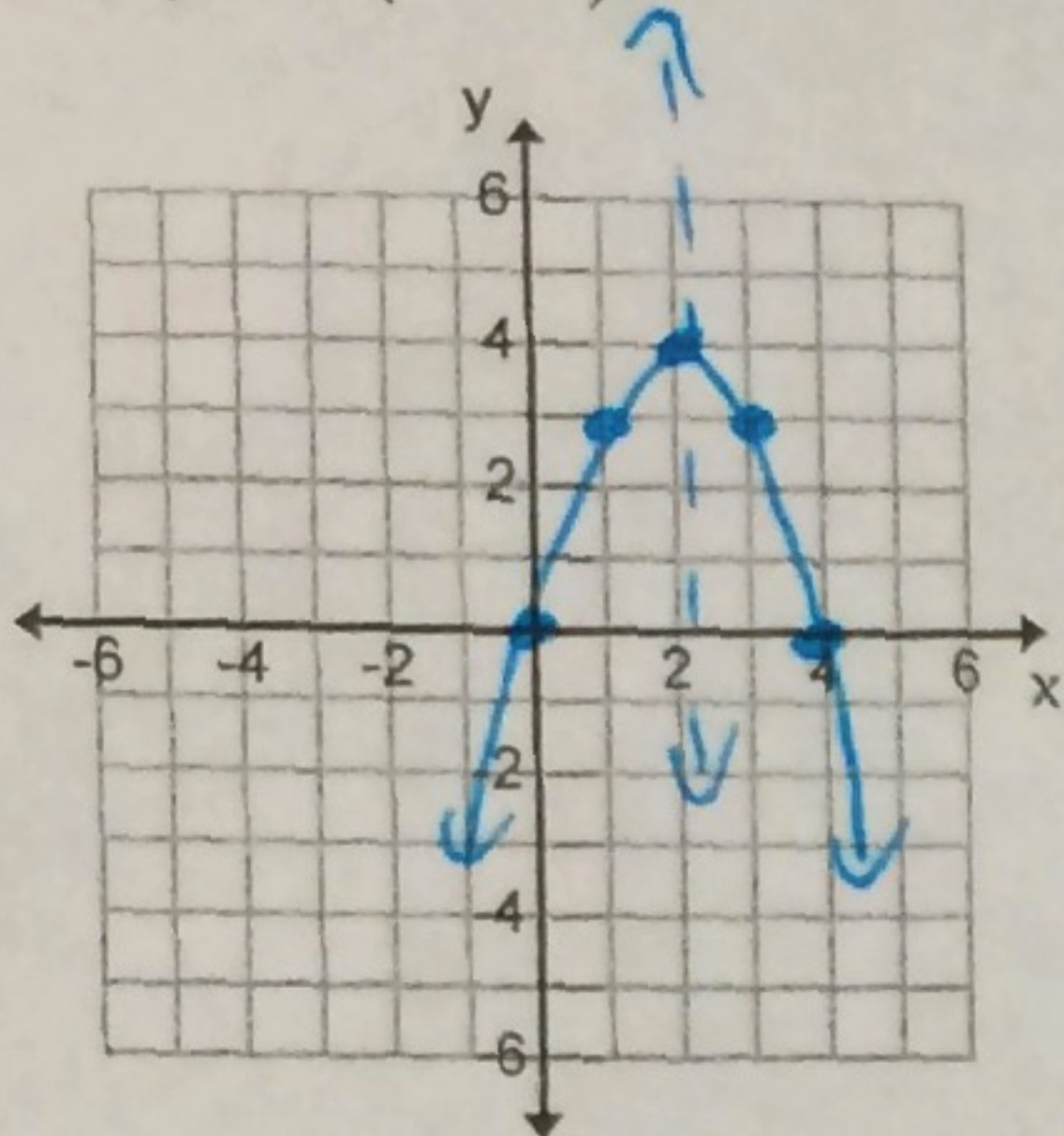
Name: _____ Period: _____

Key

Section 2.1 - Parabolas

Graph each of the following parabolas. **NO CALCULATOR**

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

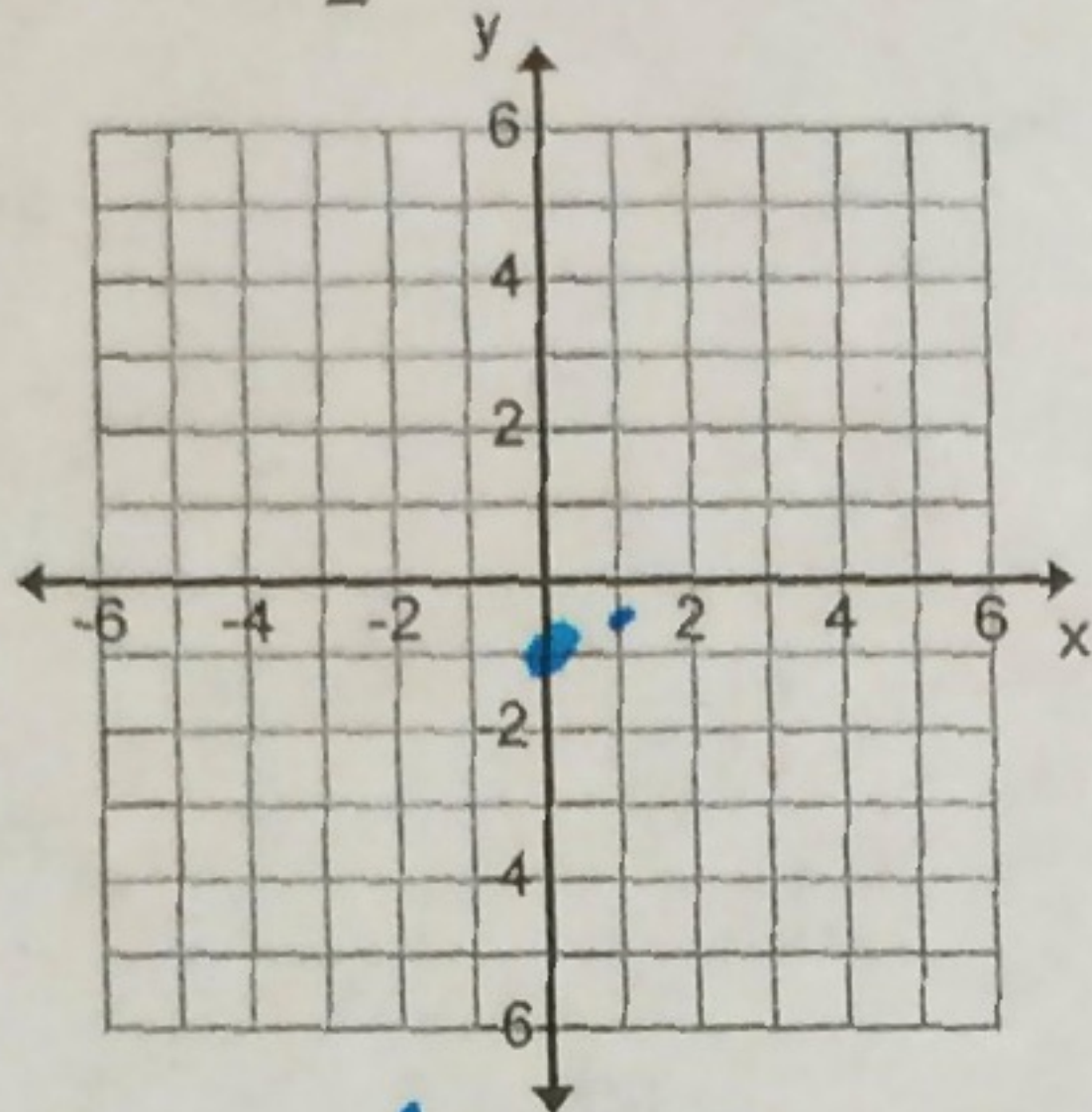


Vertex: (2, 4)

Axis of Symm.: x = 2

Zeroes: 0, 4 Y-int: 0

2. $f(x) = \frac{1}{2}x^2 - 1$

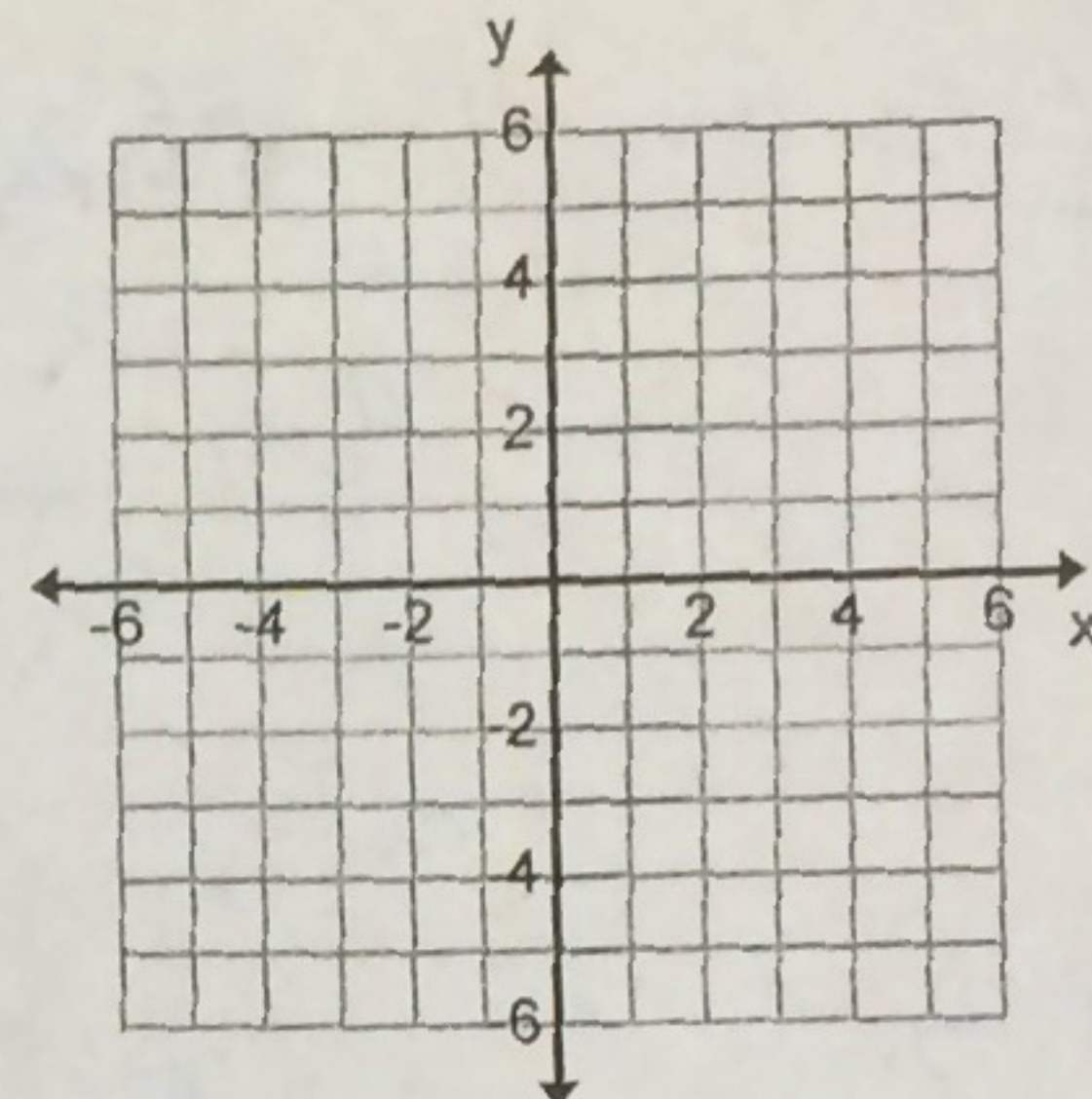


Vertex: (0, -1)

Axis of Symm.: _____

Zeroes: ±√2 Y-int: _____

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



Vertex: _____

Axis of Symm.: _____

Zeroes: -4, -2 Y-int: _____

Write an equation of a parabola with the given points in the form $y = a(x-h)^2 + k$.

Use the quadratic formula to find the zeroes of the function, or in other words, when $f(x) = 0$.

4. vertex (6, -3) and passing through the point (-2, 13)

$$y = a(x-h)^2 + k$$

$$13 = a(-2-6)^2 - 3$$

$$13 = a(64) - 3$$

$$16 = a(64)$$

$$\frac{1}{4} = \frac{16}{64} = a$$

$$y = \frac{1}{4}(x-6)^2 - 3$$

5. vertex (4, 0) and passing through the point (-1, 20)

$$a = \frac{4}{5}$$

6. $f(x) = x^2 - 2x - 1$

$$A=1 \quad B=-2 \quad C=-1$$

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

$$x = \frac{2 \pm \sqrt{(-2)^2 - 4(1)(-1)}}{2(1)}$$

$$= \frac{2 \pm \sqrt{0}}{2}$$

$$x = 1$$

7. $f(x) = 4x^2 - 16x + 13$

$$x =$$

Rewrite the parabola in vertex form by completing the square. Then graph the parabola and find the requested information. **SHOW YOUR WORK!**

8. $y = x^2 + 4x + 3$

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

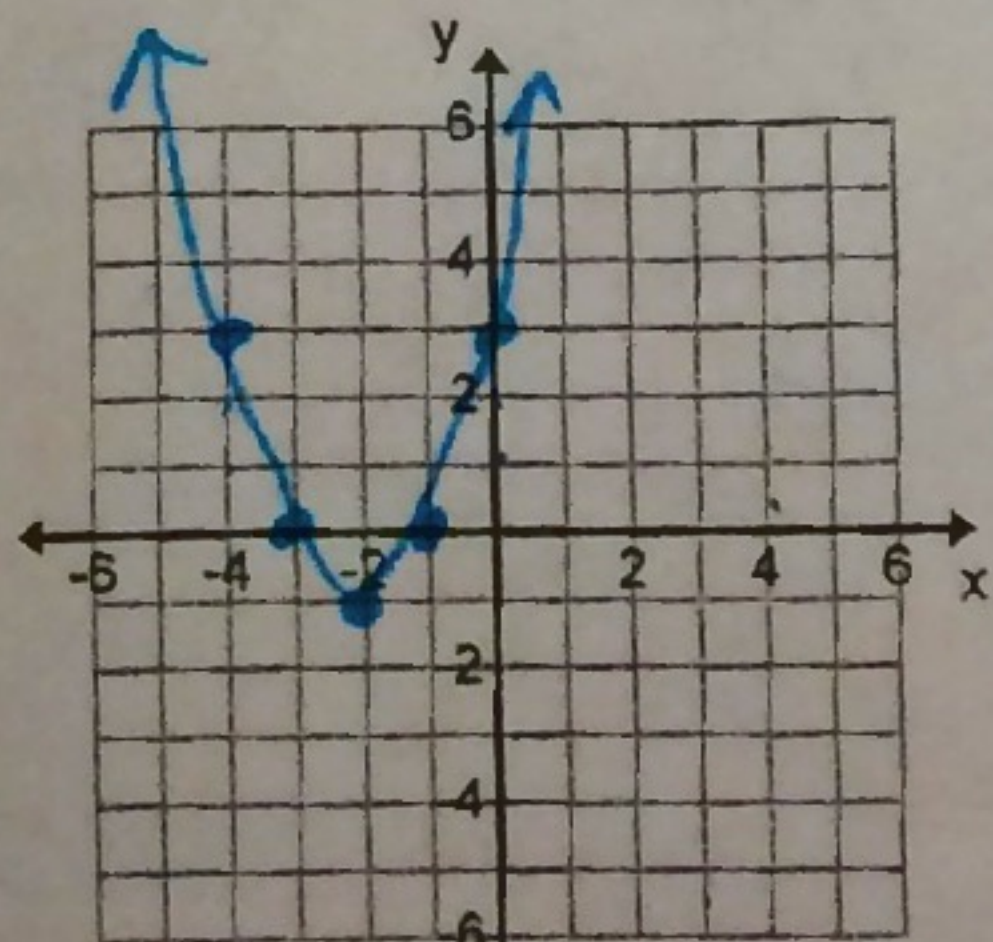
$$y = (x+2)^2 - 1$$

Equation in Vertex Form:

Vertex: (-2, -1)

Zeroes: -3, -1

Y-int: 3



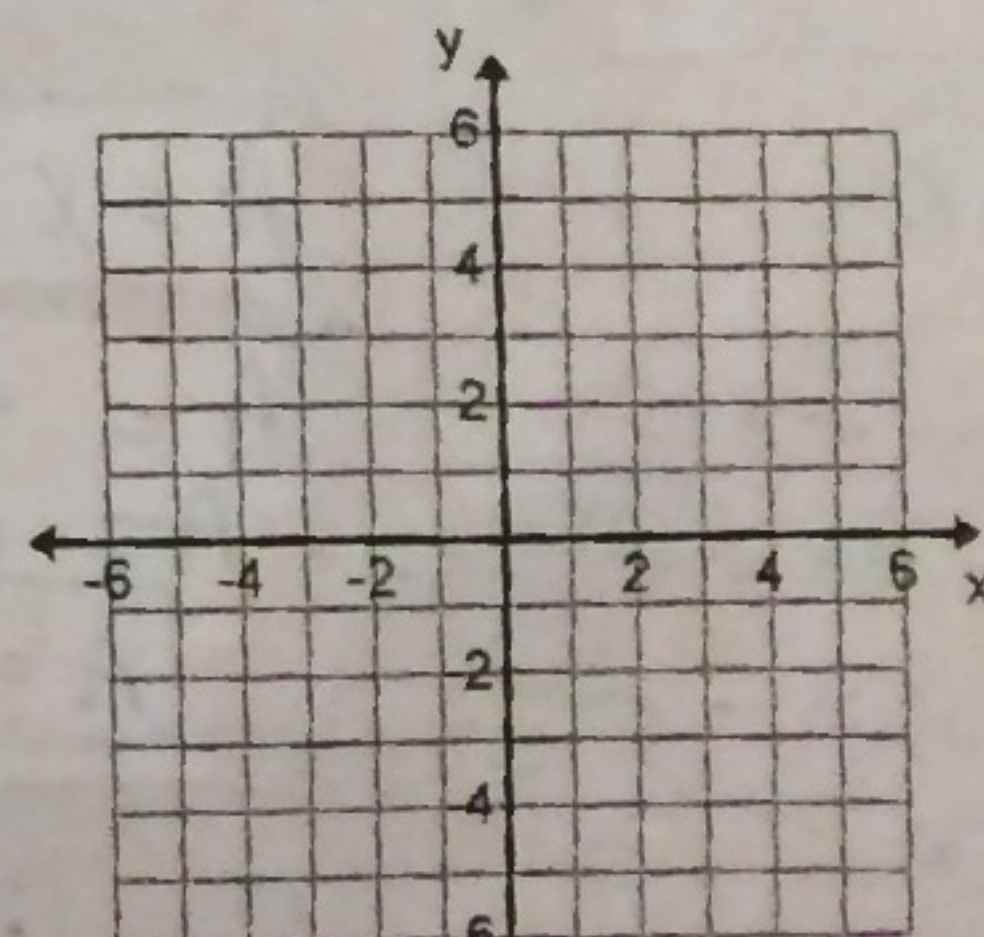
9. $y = x^2 - 10x + 29$

Equation in Vertex Form:

Vertex: _____

Zeroes: _____

Y-int: _____



Rewrite the parabola in vertex form by first finding the vertex. HINT: Start with $x = -\frac{b}{2a}$. Then graph the parabola and find the requested information. SHOW YOUR WORK!

10. $y = \frac{1}{2}x^2 - 2x - 4$

$h = \frac{-(-2)}{2(\frac{1}{2})} = \frac{2}{1}$

$y = \frac{1}{2}(2)^2 - 2(2) - 4$
 $y = 2 - 4 - 4$
 $y = -6$

11. $y = -x^2 + 10x - 21$

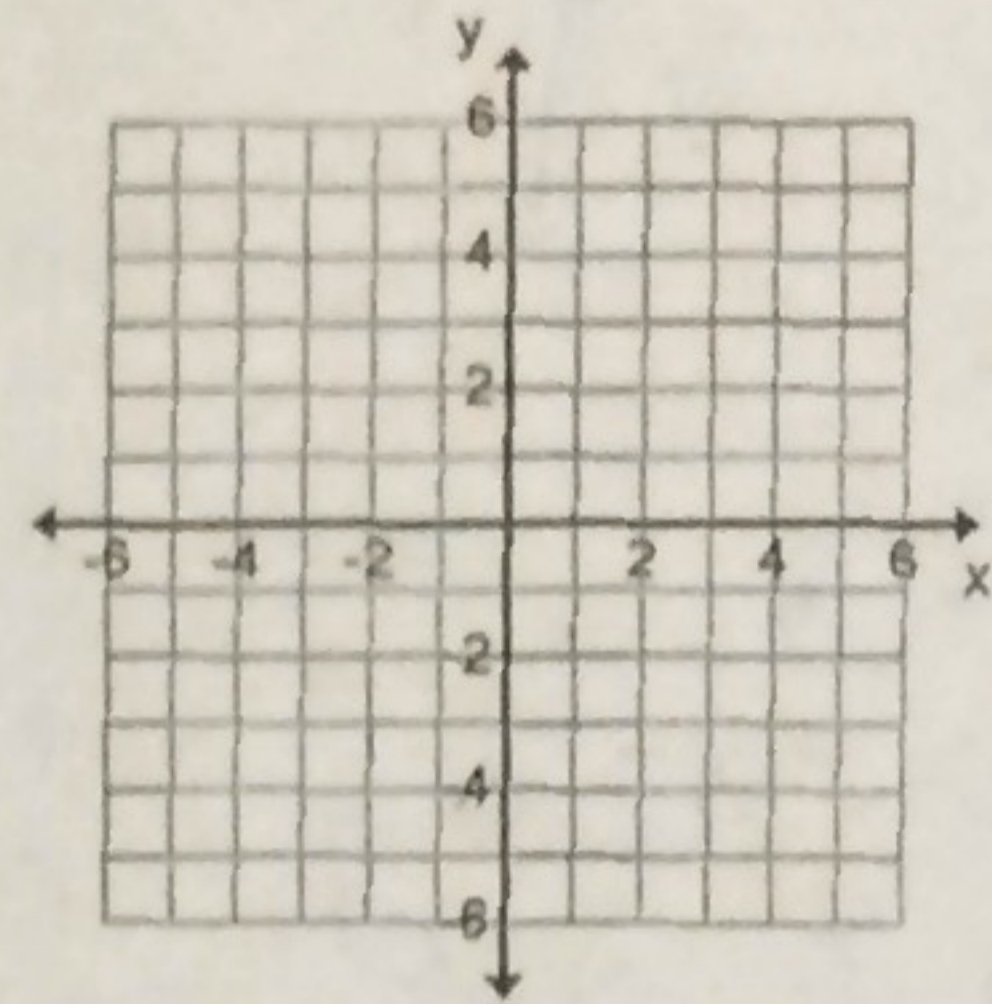
Equation in Vertex Form:

Vertex:

Axis of Symm.:

Y-int: _____

Zeroes: 7, 3



Equation in Vertex Form:

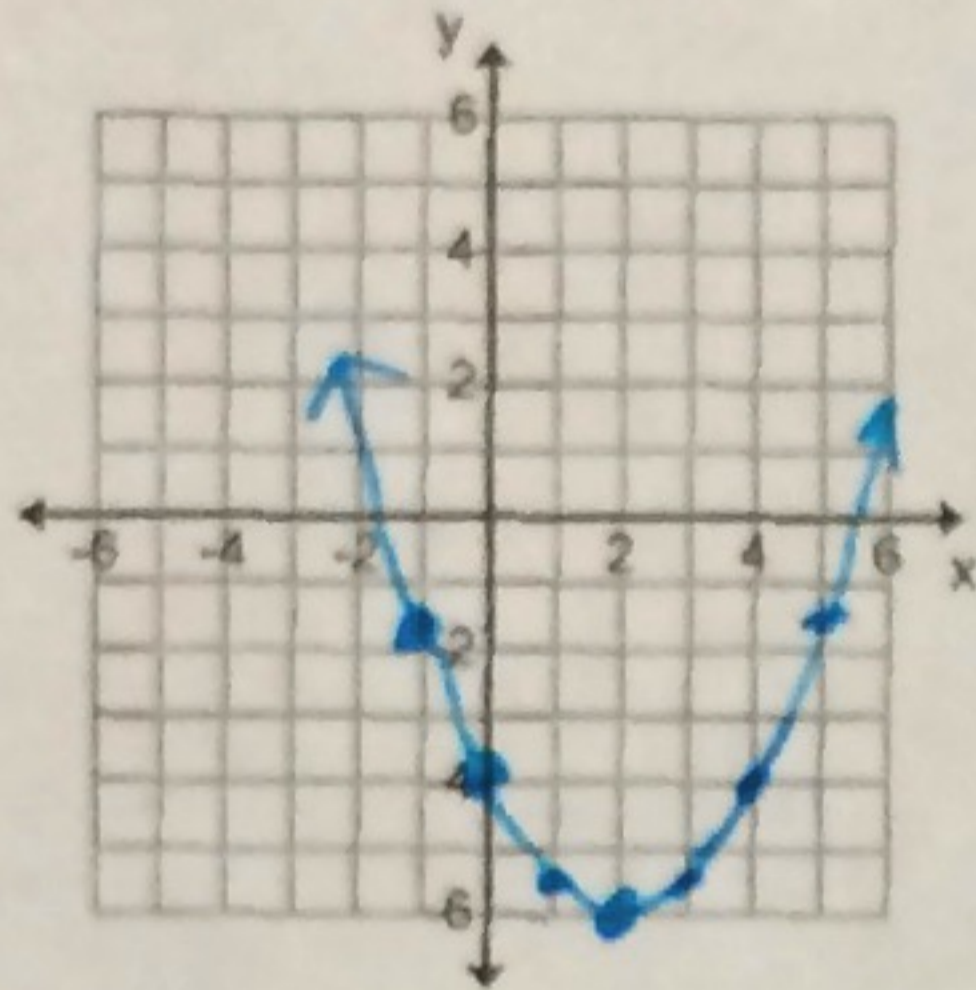
$y = \frac{1}{2}(x-2)^2 - 6$

Vertex:

$(2, -6)$

Axis of Symm.: $x=2$

Y-int: -4



For each function, find its vertex, its maximum or minimum value and where it occurs, and its zeroes.

12. $f(x) = 2x^2 + 12x + 18$

$x = \frac{-12}{2(2)} = \frac{-12}{4} = -3$

$y = 2(-3)^2 + 12(-3) + 18$

$y = 18 - 36 + 18$

$y = 0$

13. $f(x) = -x^2 + 8x - 11$

Vertex: $(-3, 0)$

The function has a min (max or min) value of 0 at -3.

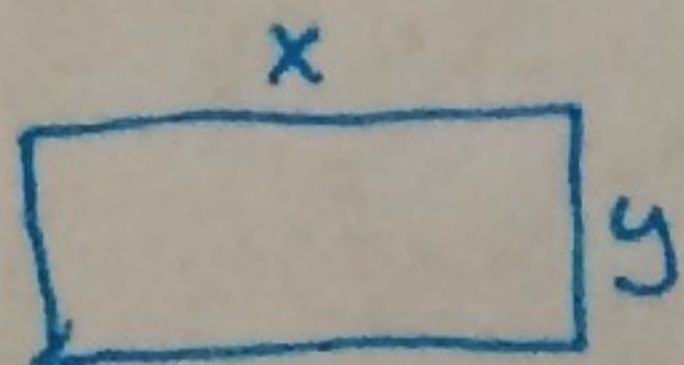
The zeros of the function are -3.

Vertex: _____

The function has a _____ (max or min) value of _____ at _____.

The zeros of the function are $4 \pm \sqrt{5}$.

14. You have a 500-foot roll of fencing and a large field. You want to construct a rectangular playground area. What are the dimensions of the largest such yard? What is the largest area?



$A = xy$

$P = 2x + 2y$

$500 = 2x + 2y$

$500 - 2x = 2y$

$250 - x = y$

→ Find the Vertex

$A = x(250 - x)$

$A = 250x - x^2$

$A = -x^2 + 250x$

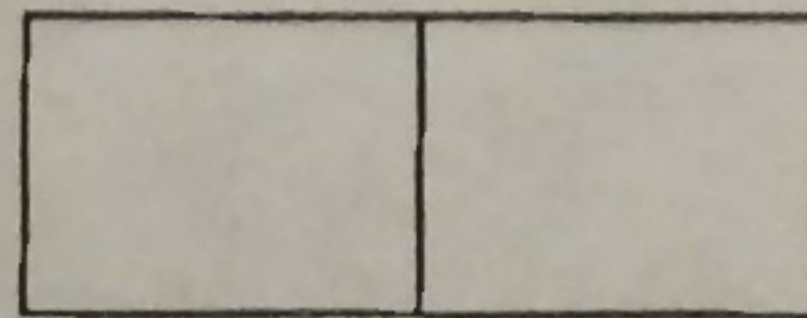
$x = \frac{-250}{-2} = 125$

$y = 125$

$125' \times 125'$

$A = 15,625 \text{ ft}^2$

15. You have a 1200-foot roll of fencing and a large field. You want to make two paddocks by splitting a rectangular enclosure in half. What are the dimensions of the largest such enclosure?



$200' \times 600'$