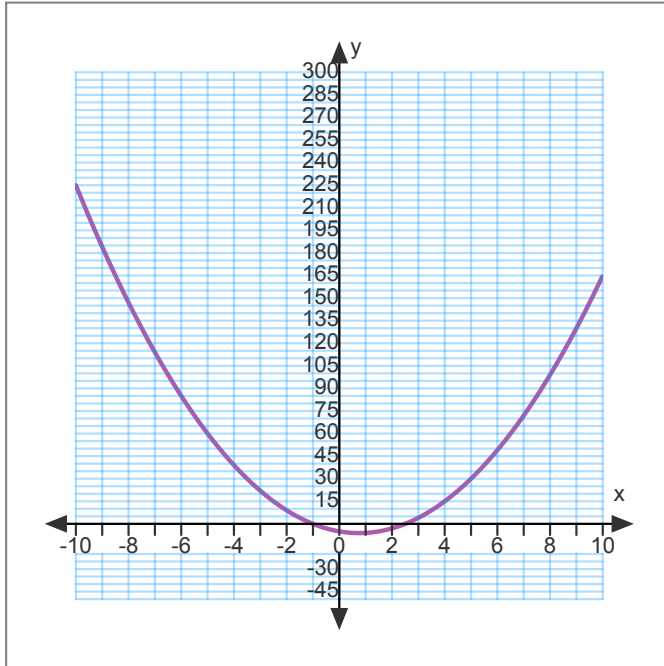# Solving Quadratics by Graphing

What are the solutions to a quadratic (polynomial)?

$$ax^2 + bx + c = 0$$

Where will these show up on a graph? where the graph crosses the x-axis
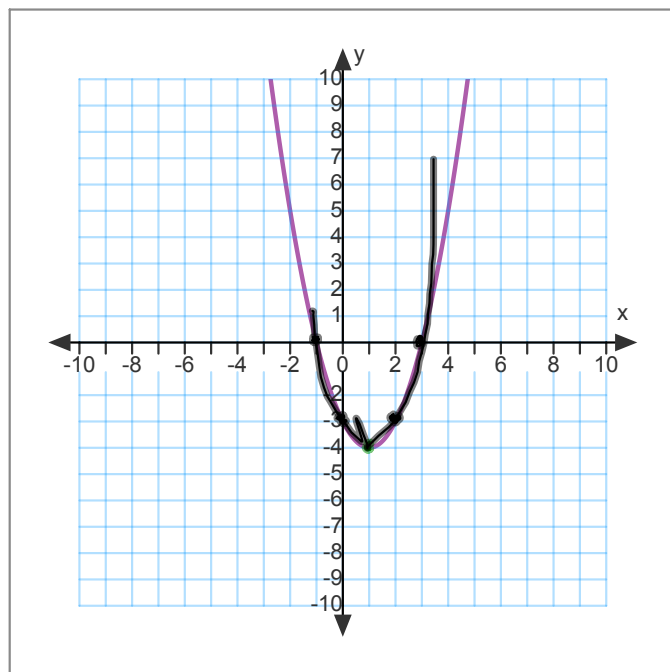
What are they called on a graph?

X-intercept(s)

$$y = 2x^2 - 3x - 5 = 0$$

Find Zeroes:

$$x = -1$$

$$x = 2.5$$

How to Find Solutions by Graphing

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

$$x^2 - 2x = 3$$

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

Graph using the method we've learned

$$\frac{-b}{2a} = \frac{2}{2} = 1$$

$$1^2 - 2(1) - 3$$
$$1 + 2 + 3 = -4$$
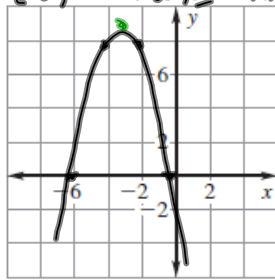$$(1, -4)$$

Be VERY CAREFUL (use graph paper and curve templates)

$$-1^2 - 2(-1) - 3$$
$$1 + 2 - 3 = 0$$

Identify the x-intercepts

x	y
0	-3
-1	0

$$X = -1 \qquad X = 3$$

Check your answers

$$-1^2 - 2(-1) - 3$$
$$1 + 2 - 3 = 0$$
$$3 - 3 = 0$$
$$\checkmark \, 0 = 0$$

$$3^2 - 2(3) - 3 = 0$$
$$9 - 6 - 3 = 0$$
$$9 - 9 = 0$$
$$\checkmark \, 0 = 0$$

2

$ax^2 + bx + c = 0$ $y = ax^2 + bx + c$ $4 - 14 + 10 = 0$

13. $-x^2 - 6x = 0$ **14.** $2x^2 = 2$ $\boxed{2x^2 - 2 = 0}$ **15.** $x^2 - 7x + 10 = 0$

$-(-2)^2 \quad '(-2) = -4 + 12 = 8$ $y = 2x^2 - 2$

$\boxed{x = 2, \; x = 5}$

$\dfrac{-b}{2a} = \dfrac{-(-6)}{2(-1)}$ $\dfrac{-b}{2a} = \dfrac{-0}{2(2)} = \boxed{0} \, x$ $\dfrac{-b}{2a} = \dfrac{+7}{2} = +3.5$

$= \dfrac{6}{-2} = \boxed{-3}$ $y = -?$ $\left(\dfrac{7}{2}\right)^2 - 7\left(\dfrac{7}{2}\right) + 10$

$-(-3)^2 - 6(-3) =$ $2\left(\dfrac{1}{2}\right)^2 - 2$ $\dfrac{49}{4} - \dfrac{49}{2} + 10$

$-9 + 18 = +9$ $2\left(\dfrac{1}{4}\right) - 2$ $\dfrac{49}{4} - \dfrac{98}{4} + \dfrac{40}{40}$
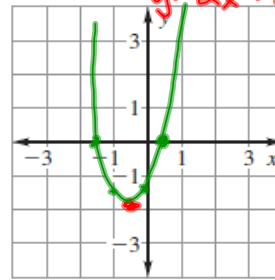
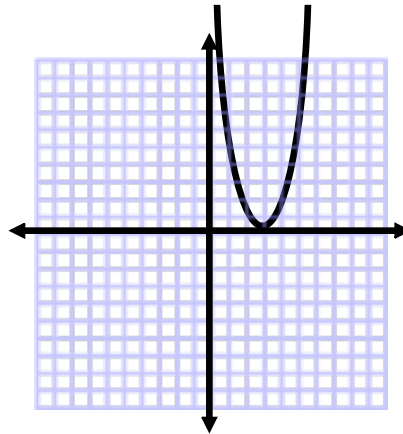$x = 0$ and $x = -6$ $\dfrac{1}{2} - 2 = 1\dfrac{1}{2}$ $\dfrac{89}{4} - \dfrac{98}{4} = \dfrac{-9}{4}$
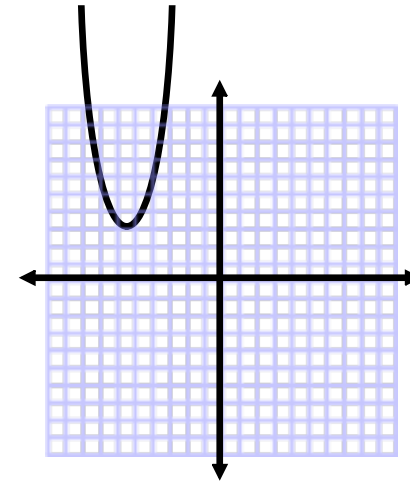
$= -2.5$

Number of Solutions of a Quadratic:
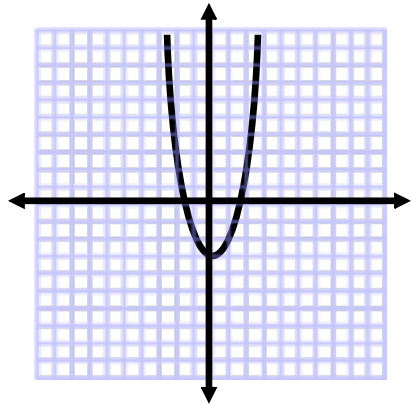
2 Solutions   one solution   no solution

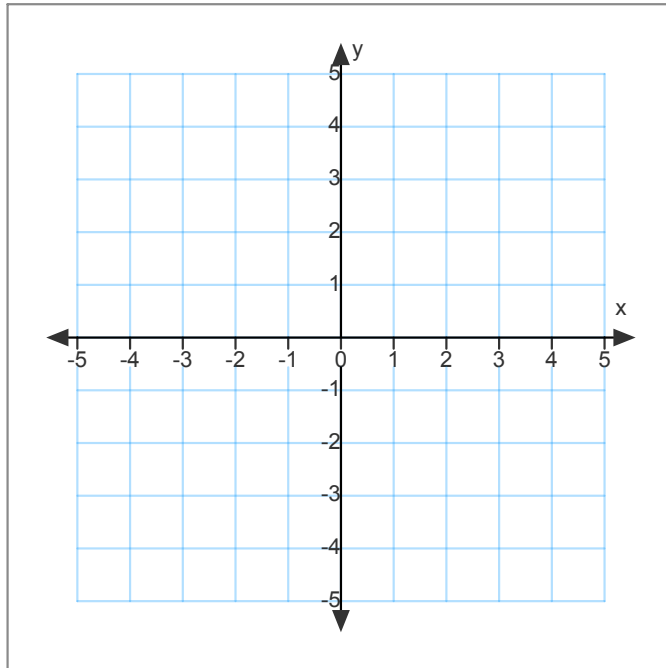# Finding the zeros of a quadratic function?

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

$y = x^2 + 6x - 7$

- graph
- find x-intercepts = zeros of a function
- check

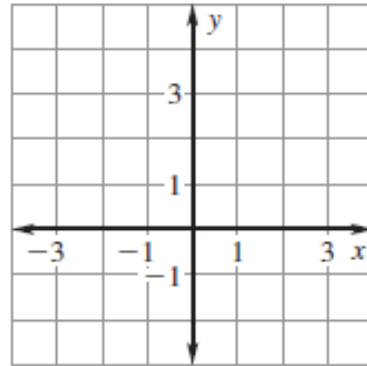# Approximating the zeros of a quadratic function

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

1. Graph the function

2. Find the boundaries of the x-intercepts (zeros)

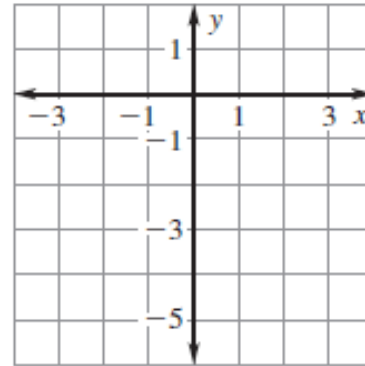3. Estimate by using tables to find the x values that give you the y values closest to 0 (use 0.1 increments)

$$x^2 + 4x + 1$$

X	Y

X	Y

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

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

Homework:

p. 647, 3-18 by 3, 22-43 by 3, 50, 53

34