Name:_______________________________________ Date:_________________________

Notes

Algebra Section 10.3

Pages 643-649

Goal: "Solve quadratic equations by graphing."

RECALL

A **quadratic equation** is: $y = ax^2 + bx + c$

A **solution** to a quadratic equation can also be called a: "Root"

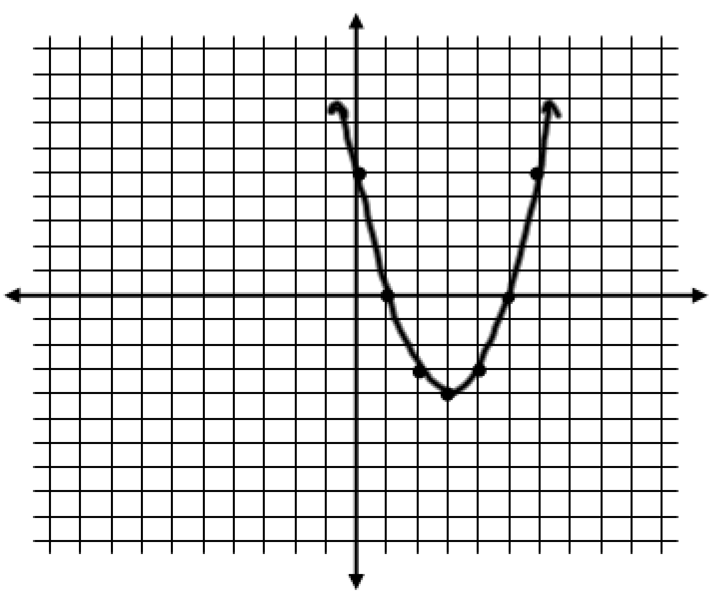
Solutions or ___ROOTS____________ are the values of x so the quadratic equation is equal to: zero

**We already know how to solve a quadratic equation by: Factoring

Since we know that solutions occur when $y = 0$, how can you identify solutions on a graph then?

Look for the values of x when $y = 0$. $Y = 0$ on the x-axis. So we are looking for the points where the parabola crosses the x-axis

Ex: The graph below models the parabola formed by the quadratic equation $y = x^2 - 6x + 5$. What do you think the solutions are? Why?

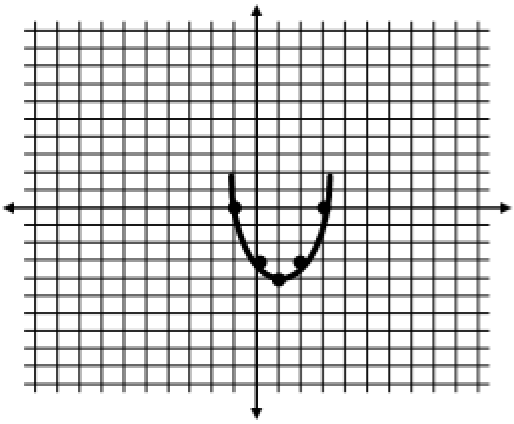


Solutions: $x = 1$ and $x = 5$

Solve the following quadratic equations by graphing:

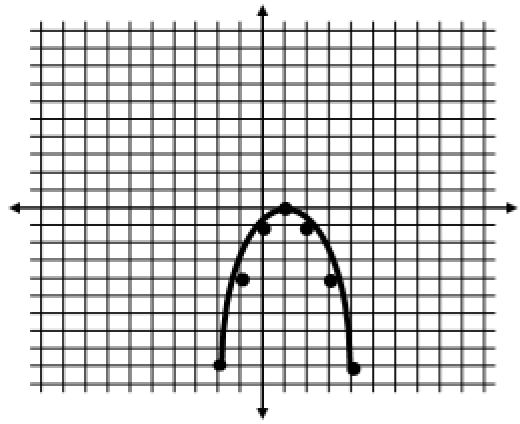
Ex: $x^2 - 2x = 3$

$x = -1$ and $x = 3$



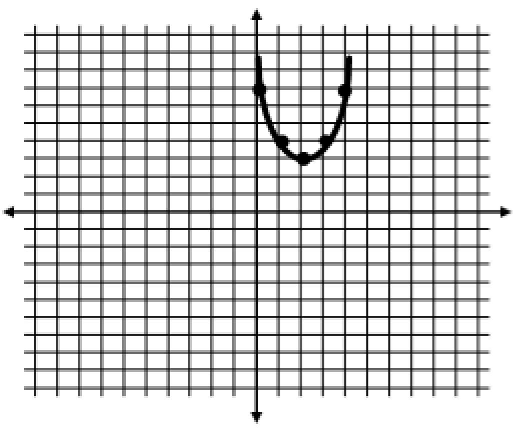
Ex: $-x^2 + 2x = 1$

$x = 1$



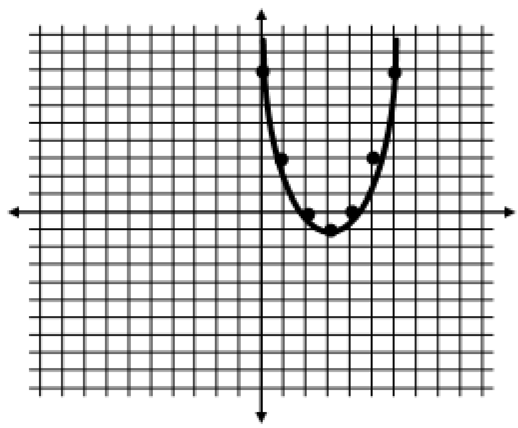
Ex: $x^2 + 7 = 4x$

No Solution



Ex: $x^2 - 6x + 8 = 0$

$x = 2$ and $x = 4$



Graph the following quadratic equations on a graphing calculator and identify the solutions.

Ex: $x^2 + 4x = 5$

$x = -5$ and $x = 1$

Ex: $-x^2 - 6x = 9$

$x = -3$

Ex: $x^2 + 4x = -6$

No solution

Ex: $x^2 + x = -1$

No Solution

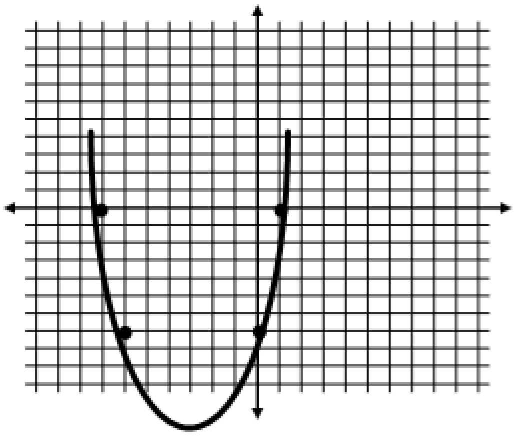
Ex: $-x^2 + 6x = 9$

$x = 3$

Find the zeros of the function.

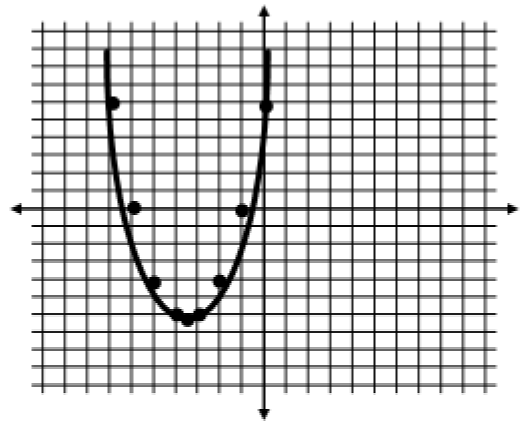
Ex: $f(x) = x^2 + 6x - 7$

$x = 1, x = -7$



Ex: $f(x) = x^2 + 7x + 6$

$x = -1$ and $x = -6$



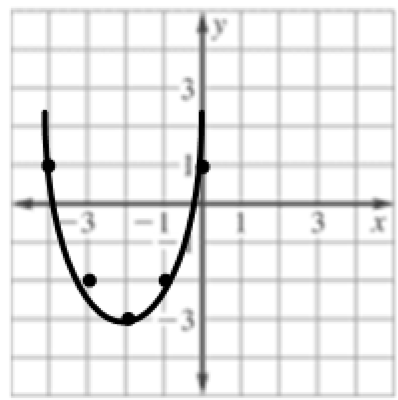
Approximate zeros to the nearest tenth:

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

1. Graph

2. Find the two integers the root falls between

3. Make a table with increments of 0.1 for *x* values. Look for a change in signs since 0 falls between positive and negative numbers.



x	–0.9	–0.8	–0.7	–0.6	–0.5	–0.4	–0.3	–0.2	–0.1
y	–1.79	–1.56	–1.31	–1.04	–0.75	–0.44	–0.11	0.24	0.61

x	–3.9	–3.8	–3.7	–3.6	–3.5	–3.4	–3.3	–3.2	–3.1
y	0.61	0.24	–0.11	–0.44	–0.75	–1.04	–1.31	–1.56	–1.79

***x* is approx..** –0.3 and –3.7

Use a graphing calculator to solve.

Ex: $f(x) = x^2 + x - 6$

$x = -3$ and $x = 2$

Ex: $f(x) = -x^2 + 2x + 2$

$x = -0.7$ and $x = 2.7$

Ex: An athlete throws a shot put with an initial vertical velocity of 40 ft/s.

a) Write an equation that models the height of the shot put as a function of the time it is in the air.

$\boldsymbol{h = -16t^2 + 40t}$

b) Use the equation to find the time the shot put is in the air.

About 2.5 seconds

Ex: A baseball player throws a ball into the air with an initial vertical velocity of 32 ft/s and is released at a height of 5 feet.

a) Write an equation that models the height of the ball based on time in the air.

$h = -16t^2 + 32t + 5$

b) Find out how long the ball is in the air.

About 2.1 seconds