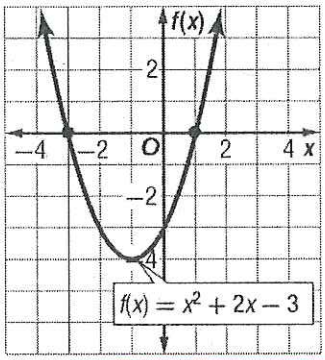
4.2 Day 1 Notes

Objectives:

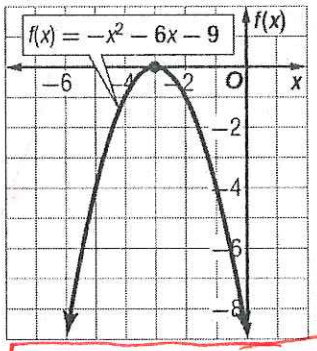
- Identify Solutions to Quadratic Functions
- Solve Quadratic Functions by Graphing
- Solve Quadratic Functions from Tables

The solutions of a quadratic equation are called the roots of the equation. One method for finding the roots of a quadratic equation is to find the zeros of the related quadratic function. The zeros of the function are the x-intercepts of its graph.

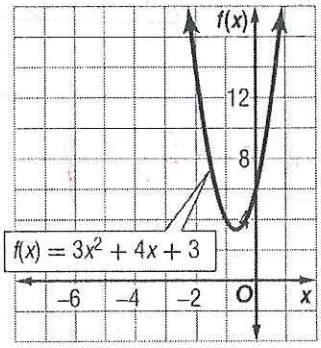
Identify the solutions of the following quadratic functions:



x = 1 or x = -3



x = -3
(double root)



none

Graph the following quadratic function and find the solution(s) form the graph:

1) $f(x) = x^2 - 8x + 12$

a = 1 b = -8 c = 12

Find the axis of symmetry:

$x = -b/2a = \frac{-(-8)}{2(1)} = \frac{8}{2} = 4$

x = 4

Find the vertex:

$f(4) = (4)^2 - 8(4) + 12$

$= 16 - 32 + 12 = -4$

(4, -4)

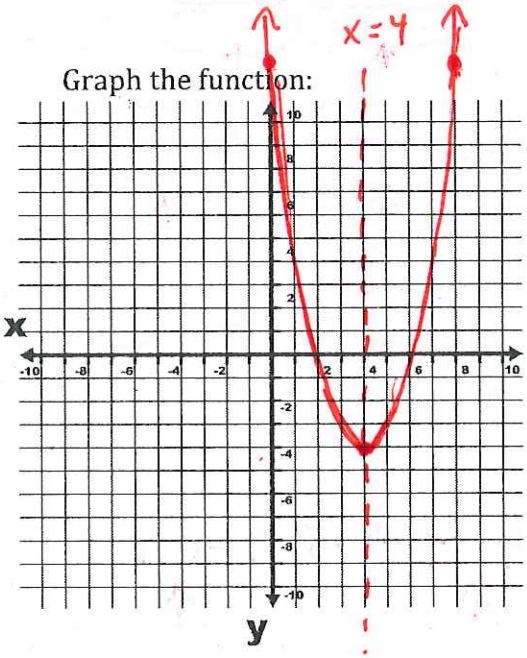
Name the y-intercept:

(0, 12)

Identify the solutions:

x = 2, x = 6

Graph the function:



2) $f(x) = x^2 + 2x - 15$

$a=1 \quad b=2 \quad c=-15$

Find the axis of symmetry:

$x = -b/2a = -2/2(1) = -2/2 = -1$

$x=-1$

Find the vertex:

$(-b/2a, f(-b/2a)) = (-1, -16)$

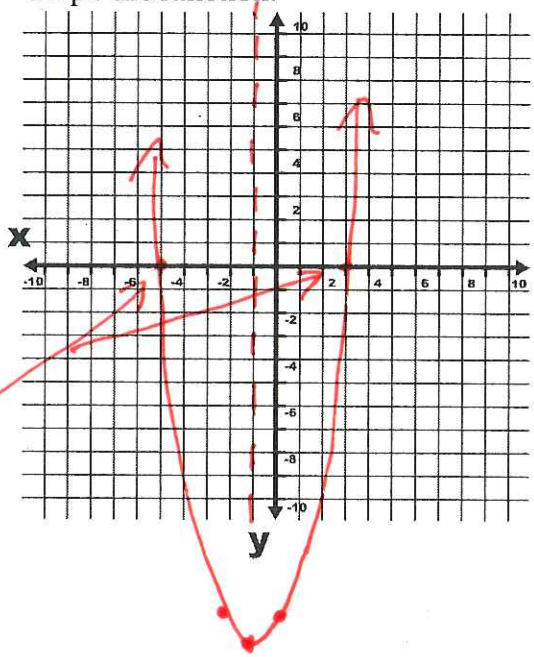
Name the y-intercept:

$(0, c) = (0, -15)$

Identify the solutions:

$x = -5, 3$

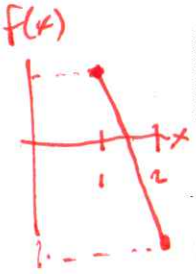
Graph the function:



Often exact roots cannot be found by graphing. You can estimate the solutions by stating the integers between which the roots are located.

When the y value of the function is changes from positive to negative (or vice versa) then there is at least one zero between the two corresponding x-values.

3) Use the tables to determine the location of the zeros of each quadratic function.



x	−7	−6	−5	−4	−3	−2	−1	0
f(x)	−8	−1	4	4	−1	−8	−22	−48

between $x = -5$ & -6
between $x = -4$ & -3

x	−6	−3	0	3	6	9	12	15
f(x)	−6	−1	3	5	3	−1	−6	−14

between $x = -3$ & 0
between $x = 6$ & 9

4) Solve $x^2 - 6x = -4$ by looking at the table in the calculator. If exact roots cannot be found, state the consecutive integers between which the roots are located.

(moved −4 over to make 4)

$y_1 = x^2 - 6x + 4$

x	0	1	2	3	4	5	6
f(x)	4	−1	−4	−5	−4	−1	4

between $x = 0$ & 1
between $x = 5$ & 6