

Name: Key

Class:

Topic:

Date:

Main Ideas/Questions

Notes

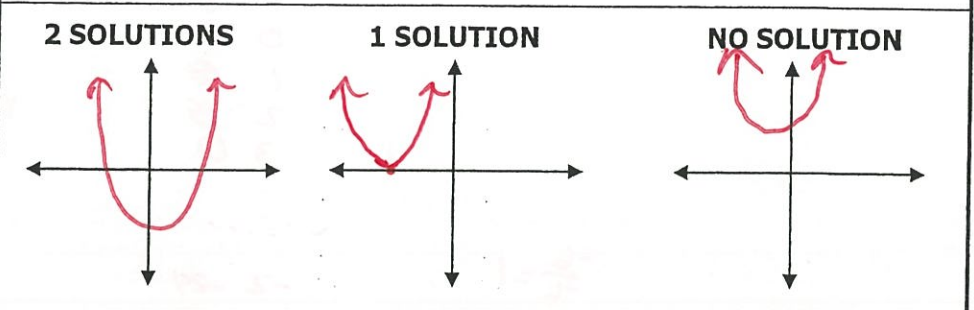
Definition

the intersection of the x-axis on the graph which is also the solution to the equation

Also called...

Solutions, x-Intercepts, Zeros

Number of Solutions



**Examples**  
Find the solutions of the following quadratics by graphing.

**Solutions:**

1.  $x = -5, 1$

2.  $x = 1$

3.  $\emptyset$

1.  $y = x^2 + 4x - 5$

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

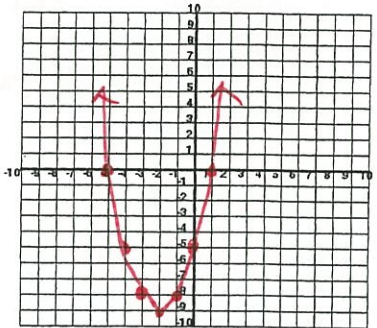
$$4 - 8 - 5$$

$$-4 - 5 = -9$$

$$9 - 12 - 5$$

$$-3 - 5$$

x	y
-5	0
-4	-5
-3	-8
-2	-9
-1	-8
0	-5
1	0



2.  $y = x^2 - 2x + 1$

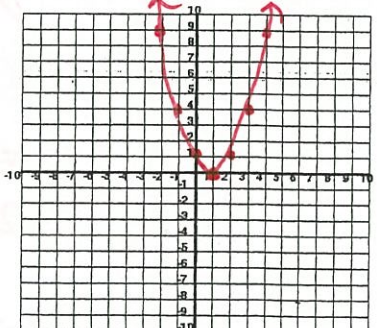
$$\frac{2}{2(1)} = \frac{2}{2} = 1$$

$$1 - 2 + 1$$

$$1 + 2 + 1$$

$$16 - 9 + 1$$

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



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

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

$$-1 + 2 - 3$$

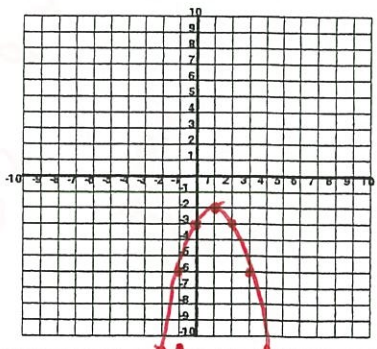
$$-9 + 6 - 3$$

$$-6$$

$$-16 + 8 - 3$$

$$-8 - 3$$

x	y
-2	-11
-1	-6
0	-3
1	-2
2	-3
3	-6
4	-11



Solutions:

4.  $x = 2, 8$

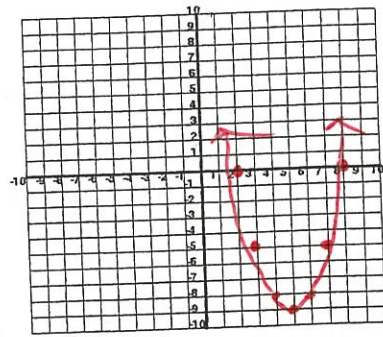
5.  $x = -3, 3$

6.  $x = 0, 2$

4.  $y = x^2 - 10x + 16$

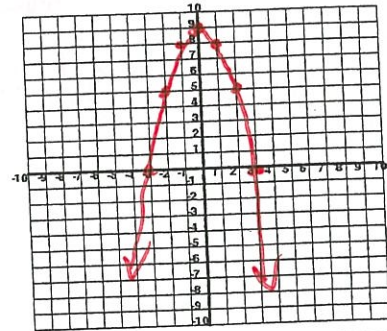
$\frac{10}{2} = 5$   
 $25 - 50 + 16$   
 $4 - 20 + 16$   
 $9 - 30 + 16$

x	y
2	0
3	-5
4	-8
5	-9
6	-8
7	-5
8	0



5.  $y = -x^2 + 9$

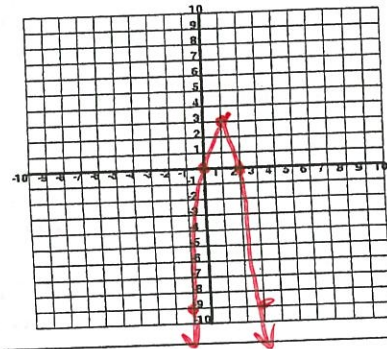
x	y
-3	0
-2	5
-1	8
0	9
1	8
2	5
3	0



6.  $y = -3x^2 + 6x$

$\frac{-6}{-6} = 1$   
 $-27 + 18$   
 $-12 - 12 = -24$

x	y
-2	-24
-1	-9
0	0
1	3
2	0
3	-9
4	-24



The Discriminant

Formula:

$d = b^2 - 4ac$

If  $d > 0$ , then there are 2 solutions.

If  $d = 0$ , then there are 1 solution.

If  $d < 0$ , then there are 0 solutions.

Examples

Use the discriminant to determine the number of solutions.

7.  $y = x^2 + 5x + 4$

$5^2 - 4(1)(4)$   
 $25 - 16 = 9$  2 solutions

8.  $y = x^2 - 3x + 10$

$(-3)^2 - 4(1)(10)$   
 $9 - 40 = -31$  No solutions

9.  $y = x^2 + 10x + 25$

$(10)^2 - 4(1)(25)$   
 $100 - 100 = 0$  1 solution

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

$d = (-4)^2 - 4(2)(-3)$   
 $= 16 + 24 = 40$  2 solutions

11.  $y = 4x^2 - 12x + 9$

$(-12)^2 - 4(4)(9)$   
 $144 - 144 = 0$  1 solution

12.  $y = -3x^2 + 5x - 8$

$(5)^2 - 4(-3)(-8)$   
 $25 - 96 = -71$  No solutions

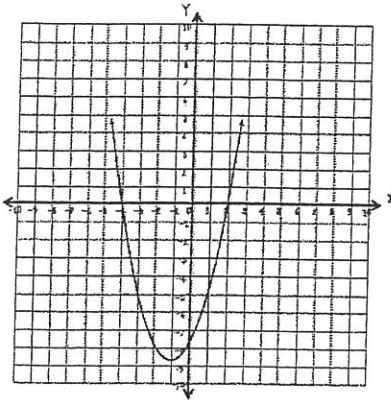
$\frac{36}{4} = 9$

$\frac{24}{4} = 6$



# Writing Quadratic Equations by Identifying the Roots!

1



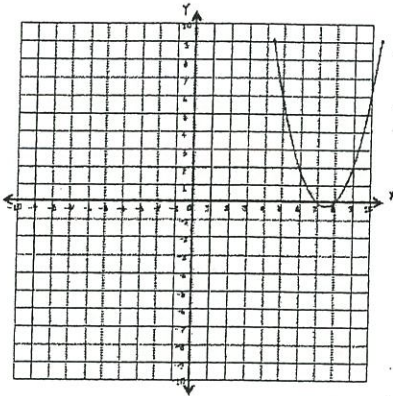
$$x = -4, 2$$

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

$$x^2 - 2x + 4x - 8$$

$$y = x^2 + 2x - 8$$

2



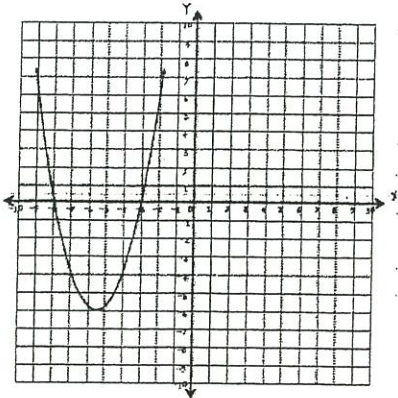
$$x = 7, 8$$

$$y = (x - 7)(x - 8)$$

$$x^2 - 8x - 7x + 56$$

$$y = x^2 - 15x + 56$$

3



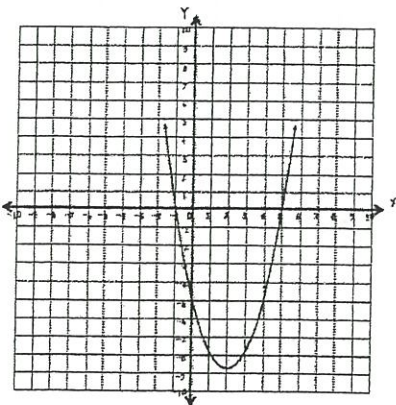
$$x = -8, -3$$

$$y = (x + 8)(x + 3)$$

$$x^2 + 3x + 8x + 9$$

$$y = x^2 + 11x + 9$$

4



$$x = -1, 5$$

$$y = (x + 1)(x - 5)$$

$$x^2 - 5x + 1x - 5$$

$$y = x^2 - 4x - 5$$

