Solving Quadratic Equations:

1. Factoring. Works only if quadratic is factorable.
2. Square Roots. Works only if b=0
3. Graphing. Works only if solutions are real #'s
4. Quadratic Formula. **ALWAYS WORKS!**
5. Completing the Square. Works only if a=1 and best if b is even.

Solving equations by completing the square:

a must equal 1 best if b is even

1. Write equation in the form: $x^2 + bx = c$
2. Complete the square by adding $\left(\frac{b}{2}\right)^2$ to both sides.

$$x^2 + bx + \left(\frac{b}{2}\right)^2 = c + \left(\frac{b}{2}\right)^2$$

3. Rewrite equation in the form: $(x + \frac{b}{2})^2 =$
4. Solve using square roots.

$x^2 - 20x + 12 = 0$

$x^2 - 20x + 100 = -12 + 100$

$x^2 - 20x + 100 = 88$

$\sqrt{(x-10)^2} = \sqrt{88}$

$x - 10 = \pm 2\sqrt{22}$

$+10 \quad +10$

$x = 10 \pm 2\sqrt{22}$

Solve each by completing the square.

1. $x^2 - 10x - 11 = 0$
2. $x^2 + 6x + 2 = 0$
3. $x^2 - 8x + 28 = 1$

1. $x^2 - 10x - 11 = 0$ $+11$ $+11$

$x^2 - 10x + 25 = 11 + 25$

$\sqrt{(x-5)^2} = \sqrt{36}$

$x - 5 = \pm 6$ $+5$ $+5$

5 ± 6

$x = -1, 11$

2. $x^2 + 6x + 2 = 0$

$x^2 + 6x = -2$

$x^2 + 6x + 9 = 7$

$(x+3)^2 = 7$

$x + 3 = \sqrt{7}$

$x = -3 \pm \sqrt{7}$

3. $x^2 - 8x + 28 = 1$ -28 -28

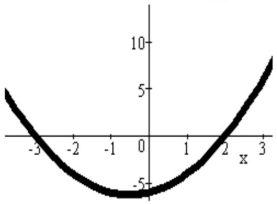
$x^2 - 8x + 16 = -27 + 16$

$\sqrt{(x-4)^2} = \sqrt{-11}$

$x - 4 = \pm\sqrt{-11}$ $+4$ $+4$

$x = 4 \pm i\sqrt{11}$

1. Write a possible equation for this parabola in Standard Form:



$ax^2 + bx + c$

$(x-2)(x+3)$

$= x^2 + x - 6$

2. Find the equation of a quadratic, in Standard Form, with the following solutions:

$\frac{5}{2}$ and $\frac{-1}{4}$

$(2x-5)(4x+1)$

$8x^2 - 18x - 5$

Zeros

$-\frac{7}{3}$ & 4

$(3x+7)(x-4)$

Zeros

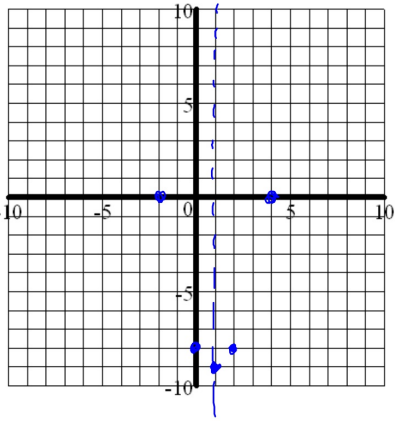
2.5 & 1.2

$\frac{5}{2}$ $\frac{6}{5}$

$(2x-5)(5x-6)$

Graph this quadratic using five points.

$y = (x-4)(x+2) = 1x^2 - 2x - 8$

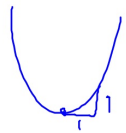


x-int: 4, -2

LOS $x = \frac{4+-2}{2} = 1$

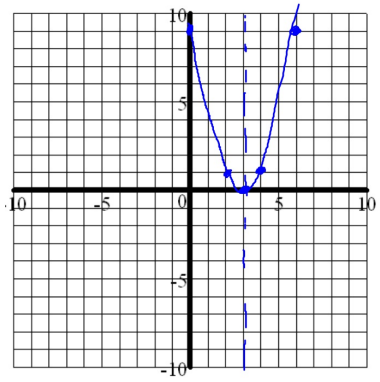
Vertex (1, -9)

x	y



Graph this quadratic using five points.

$y = (x-3)^2$ 3 is called a double zero.



$x^2 - 6x + 9$

$(x-3)(x-3)$

x-int 3, 3

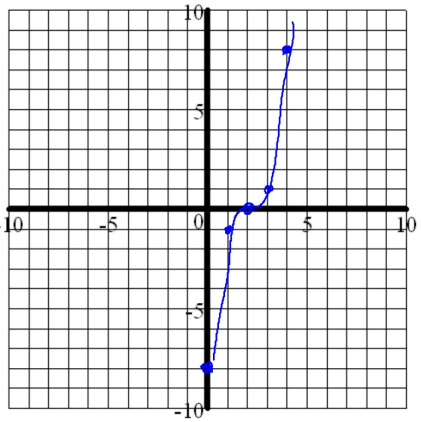
LOS $\frac{3+3}{2} = 3$

Vertex (3, 0)

x	y

Graph this cubic equation:

$y = (x-2)^3$ 2 is called a triple zero



x	y
-2	-64
-1	-27
0	-8
1	-1
2	0

3 | 1

4 | 8