

1. The length of a rectangle is 5 more than 2 times the width. If the perimeter is 82 cm, what are the dimensions of the rectangle?

$w = \text{width } 12 \text{ cm}$
 $5 + 2w = \text{length}$
 $5 + 2(12) = 29 \text{ cm}$

$$\begin{array}{r}
 5+2w \\
 \hline
 6w + 10 = 82 \\
 -10 \quad -10 \\
 \hline
 6w = 72 \\
 \frac{6}{6} \quad \frac{72}{6} \\
 w = 12
 \end{array}$$

12×29

2. Factor: $(49x^4 - 9x^2)$

$x^2(49x^2 - 9)$
 \downarrow
 $x^2(7x+3)(7x-3)$

3. Simplify: $(4x + 5)^2$

$(4x+5)(4x+5)$
 $16x^2 + 20x + 20x + 25$
 $16x^2 + 40x + 25$

Solution(s) to a Quadratic Function

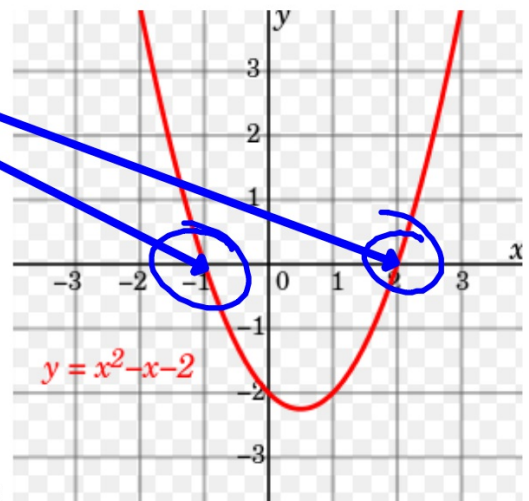
ROOTS

(These all mean the same thing)

ZEROS

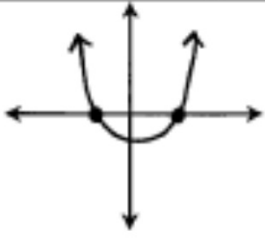
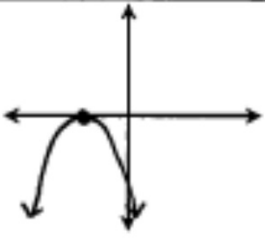
X-Intercepts

$\{-1, 2\}$



*Where the parabola crosses the x-axis

Draw each of the following graphs on your worksheet....

NUMBER OF SOLUTIONS	2 SOLUTIONS	1 SOLUTION	NO SOLUTION
			

<p style="text-align: center;">THE DISCRIMINANT</p>		
	<p>Formula: $b^2 - 4ac$</p>	<p>> If $d > 0$, then there are <u>2</u> solutions. > If $d = 0$, then there are <u>1</u> solutions. > If $d < 0$, then there are <u>0</u> solutions.</p>
<p style="text-align: center;">EXAMPLES</p> <p>Use the discriminant to determine the number of solutions.</p>	<p>7. $y = x^2 + 5x + 4$</p> <p><input type="checkbox"/> 2 solutions <input type="checkbox"/> 1 solution <input type="checkbox"/> 0 solutions</p>	<p>8. $y = x^2 - 3x + 10$</p> <p>$(-3)^2 - 4(1)(10)$ $9 - 40 = -31$</p> <p><input type="checkbox"/> 2 solutions <input type="checkbox"/> 1 solution <input checked="" type="checkbox"/> 0 solutions</p>
	<p>9. $y = x^2 + 10x + 25$</p> <p>$(10)^2 - 4(1)(25)$ $100 - 100 = 0$</p> <p><input type="checkbox"/> 2 solutions <input checked="" type="checkbox"/> 1 solution <input type="checkbox"/> 0 solutions</p>	<p>10. $y = 2x^2 - 4x - 3$</p> <p>$(-4)^2 - 4(2)(-3)$ $16 + 24 = 40$</p> <p><input checked="" type="checkbox"/> 2 solutions <input type="checkbox"/> 1 solution <input type="checkbox"/> 0 solutions</p>
	<p>11. $y = 4x^2 - 12x + 9$</p> <p><input type="checkbox"/> 2 solutions <input type="checkbox"/> 1 solution <input type="checkbox"/> 0 solutions</p>	<p>12. $y = -3x^2 + 5x - 8$</p> <p><input type="checkbox"/> 2 solutions <input type="checkbox"/> 1 solution <input type="checkbox"/> 0 solutions</p>



Graphing Quadratic Equations

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

Steps to graph a quadratic equation:

Step 1: Find the axis of symmetry.

Step 2: Find the vertex.

Step 3: Fill in a table of values using your calculator.

Step 4: Graph!

Practice!

$$A.O.S = \frac{-b}{2a}$$

Graph each quadratic equation.

1. $y = x^2$

Axis of Symmetry: $x = 0$

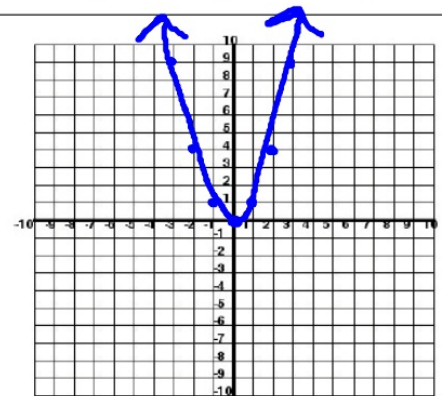
Vertex: $(0, 0)$

Domain: All \mathbb{R} #

Range: $y \geq 0$

Zeros: $\{0\}$

x	y
-2	4
-1	1
0	0
1	1
2	4



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

Axis of Symmetry: $x = -1$

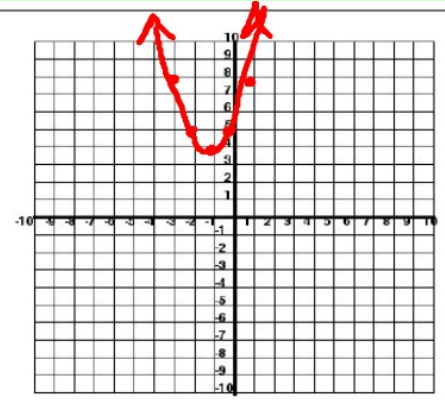
Vertex: $(-1, 4)$

Domain: All \mathbb{R} #'s

Range: $y \geq 4$

Zeros: None

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



3. $y = -x^2 - 8x - 17$

Axis of Symmetry: $x = -4$

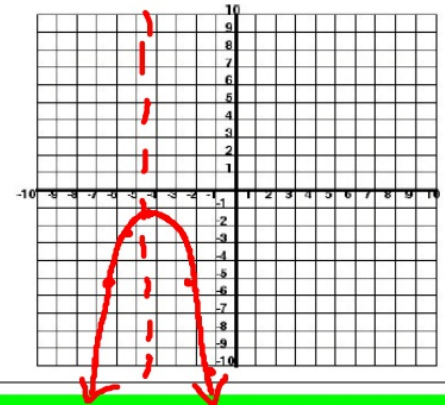
Vertex: $(-4, -1)$

Domain: All \mathbb{R} #'s

Range: $y \leq -1$

Zeros: None

x	y
-6	-5
-5	-2
-4	-1
-2	-5
-1	-10



A.O.S. $\frac{-b}{2a} = \frac{8}{-2} = -4$

$y = -(-4)^2 - 8(-4) - 17$
 $-16 + 32 - 17$
 -1

$-36 + 48 - 17$
 $-25 + 40 - 17$
 $-4 + 16 - 17$
 $-1 + 8 - 17$

6. $y = -x^2 - 4$

Axis of Symmetry: $x=0$

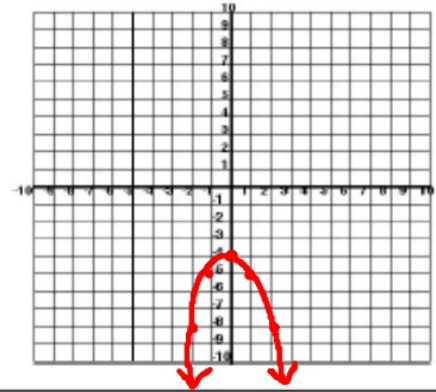
Vertex: $(0, -4)$

Domain: All \mathbb{R} #'s

Range: $y \leq -4$

Zeros: None

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



7. $y = 2x^2 + 8x$

Axis of Symmetry: $x = -2$

Vertex: $(-2, -8)$

Domain: All \mathbb{R} #'s

Range: $y \geq -8$

Zeros: $\{-4, 0\}$

x	y
-4	0
-3	-6
-2	-8
-1	-6
0	0



$$\frac{-b}{2a} = \frac{-8}{4} = -2$$

$$y = 2(-2)^2 + 8(-2)$$

$$y = -8$$

$$32 - 32$$

$$18 - 24$$

$$2 - 8$$

$$0$$