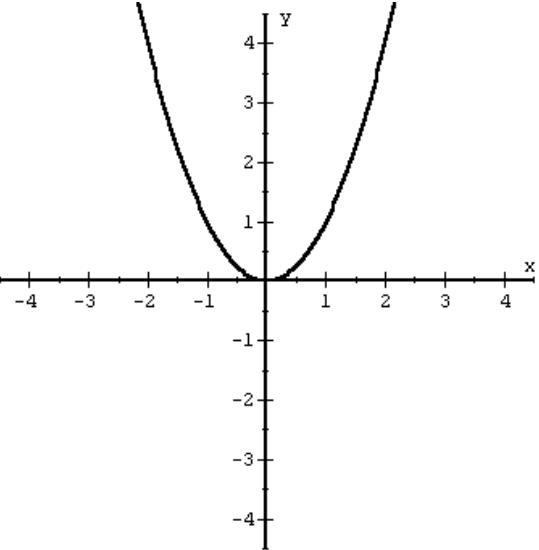
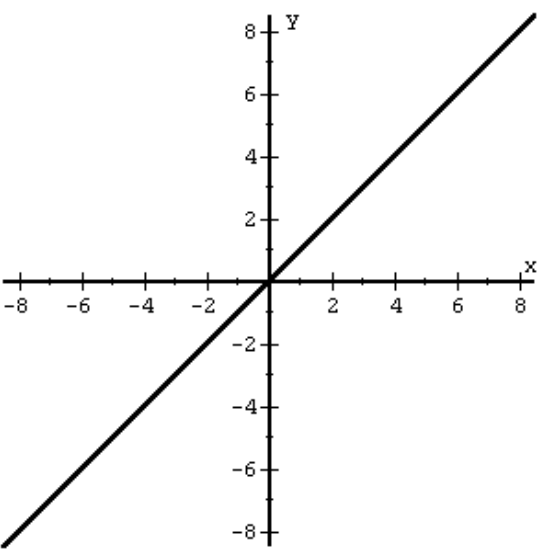




GRAPHING QUADRATICS

HOMEWORK AND NOTES DUE EXAM DAY NAME _____ PD _____

Let's compare quadratic and linear equations:

<p style="text-align: center;"><u>Quadratic</u></p> 	<p style="text-align: center;"><u>Linear</u></p> 
<p style="text-align: center;">$y = ax^2 + bx + c$ $c = y \text{ intercept}$</p> <p>c is the constant or numerical term Changing c translates the graph up and down.</p> <p>a makes the graph get wider or narrower. The larger the a the narrower the graph; the smaller the a the wider the graph.</p> <p>–a reflects the graph over the x-axis.</p> <p>b moves the graph left and right</p>	<p style="text-align: center;">$y = mx + b \text{ or } Ax + By = C$ $b = y \text{ intercept}$</p> <p>b the constant or the numerical term Changing b translates the graph up and down</p> <p>m this is the slope and changing it will make the graph get steeper or flatter. The larger the m the steeper the graph. The smaller the m the flatter the graph.</p> <p>–m reflects the graph over the y – axis. Changing the value of m rotates the graph around the y-intercept.</p>

Summary for TAKS Quadratics

- **c** is the y intercept and translates the parabola up and down
- **a** makes the parabola get wider or narrower
- Making the “**a**” negative reflects the parabola over the y – axis.
- **Vertex** – minimum or maximum point of a parabola
- Parabolas either open “up” or “down”
- If the parabola opens “up”, **a** is positive 
- If the parabola opens “down”, “**a**” is negative 
- **MINIMUM**: When a parabola opens up, the vertex is the lowest point on the graph and it is called a.
- **MAXIMUM**: When a parabola opens down, the vertex is the highest point on the graph and it is called a
- **HINT: To date, TAKS has never tested on the effect of “**b**” so answers about moving left or right are wrong !!!!!**
- The **axis of symmetry** is the vertical line that passes through the vertex and the parabola and is the center of the parabola – it cuts the parabola in half.
- If there is no “**b**” in your equation, the axis of symmetry is the y axis (nice!!!) If there is a “**b**”, the axis of symmetry is $x = \frac{-b}{2a}$
- As a vertical line the axis of symmetry is the equation: $x = \frac{-b}{2a}$
- The vertex is an (x, y) ordered pair. The value for **y** may be calculated by inserting $x = \frac{-b}{2a}$ into the equation for **x** and solve for **y**.
- Solving a quadratic equation means to find the values of **x** where the parabola crosses/touches the x-axis. **The solutions may be identified as**

roots = zeros = solutions = x – intercepts

HOW TO GRAPH A QUADRATIC.

Example: $y = 3x^2 + 6x - 4$

$$a = 3, \quad b = 6, \quad c = -4$$

c = the y intercept.

Graph it.

Find the "axis of symmetry"

$$x = \frac{-b}{2a} = -\frac{6}{2(3)} = -1$$

Go to $x = -1$ and make a vertical dotted

line

Vertex: Use your x from the axis of symmetry; plug it into the equation to find the y value of the vertex.

$$y = 3(-1)^2 + 6(-1) - 4 =$$

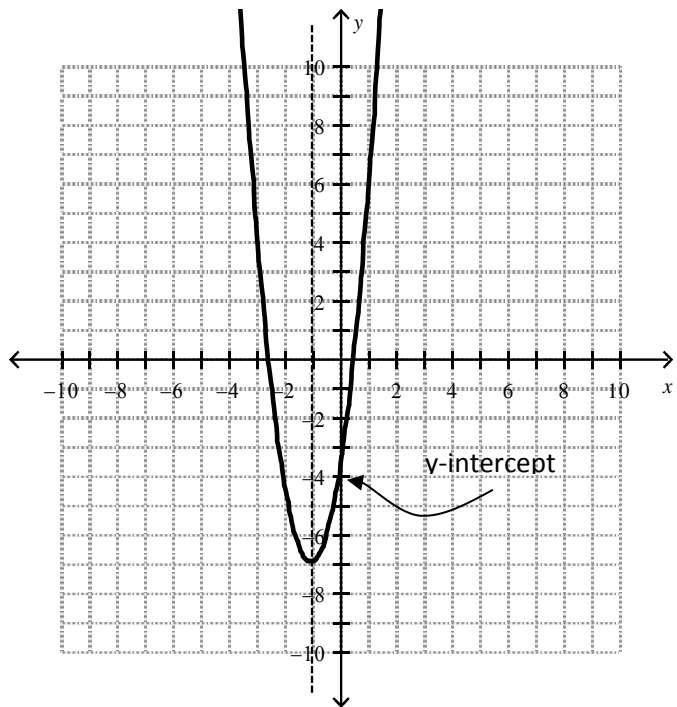
$3 - 6 - 4 = -7$ so the vertex is $(-1, -7)$

Graph it.

Reflection of y -intercept: There has to be a point on the other side of the axis of symmetry that is the reflection of the y intercept. The distances will be equal.

That point is $(-2, -6)$. Graph it.

Estimate what the solutions to this equation are. Where does the parabola cross the x -axis?



Now to get a 3rd point and its reflection to assist in graphing the parabola I look to the next value of x . We have the y -intercept where $x = 0$ now let's calculate the value of y for $x = 1$:

$$y = 3(1)^2 + 6(1) - 4$$

$$= 3 + 6 - 4$$

$$y = 5 \quad \text{or} \quad (1, 5)$$

Using symmetry the reflected point will be 2 units from the axis of symmetry or at $(-3, 5)$

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

Axis of symmetry _____

Vertex _____ - Plot on the graph

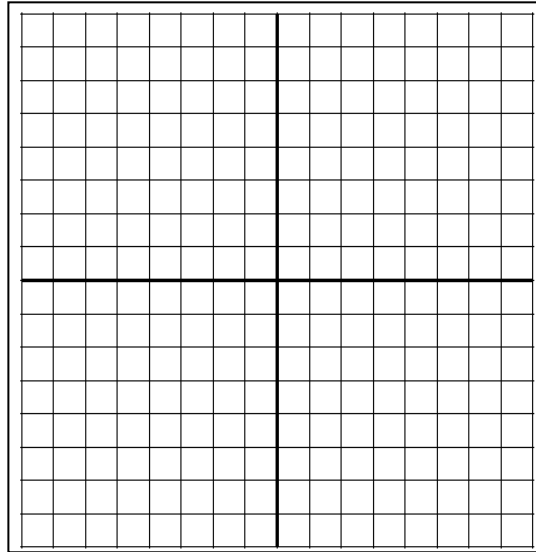
Y intercept? _____

Reflection of y intercept _____ - Plot on the graph

Choose a value for x, and calculate the corresponding value of y. Plot your point and its reflection.

Sketch in graph

Best estimate of roots? _____



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

Axis of symmetry _____

Vertex _____ - Plot on the graph

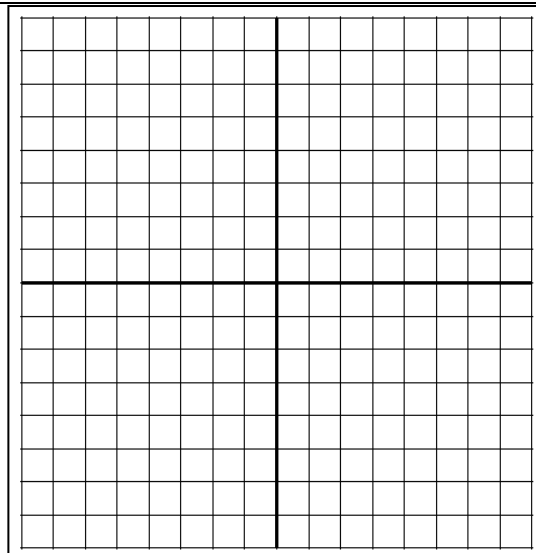
Y intercept? _____

Reflection of y intercept _____ - Plot on the graph

Choose a value for x, and calculate the corresponding value of y. Plot your point and its reflection.

Sketch in graph

Best estimate of roots? _____



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

Axis of symmetry _____

Vertex _____ - Plot on the graph

Y intercept? _____

Reflection of y intercept _____ - Plot on the graph

Choose a value for x, and calculate the corresponding value of y. Plot your point and its reflection.

Sketch in graph

Best estimate of roots? _____

