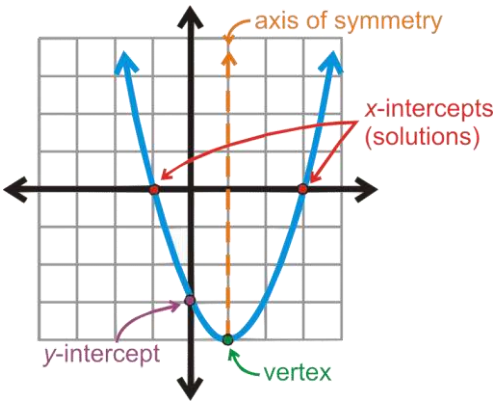
Algebra 1 Week 3 notes Graphing parabola's connecting zero's as x-intercepts

The graph of a Quadratic Function is called The Parabola.

Parts of the Parabola



Finding the Vertex from Factored Form

Example

- Determine the zero(s) for each of the following and use them to find the coordinates of the vertex.

$$y=-(x-2)(x-8)$$

Find the zeros

Method 1:

Notice that this is already in factored form. The zeros are opposite of the signs of the factors in factored form.

The zero's are 2 and 8.

Method 2:

Set y=0 since we are looking for the x-intercepts.

0 = -(x-2) (x-8)

0 = (x-2) (x-8) multiplied both sides by -1

Either x-2 = 0 or x-8 = 0

x = 2 or x = 8

Therefore, zeros are 2 and 8.

To vertex is a point and has a x and y component.
The x component we notate as h and the y component we notate as k.
(x, y) becomes (h, k) when we talk about the vertex.

To find the vertex,

h = (2+8)/2 ← find the midpoint of the zeros (x-value)

h = 5

k = -(5-2)(5-8) ← find the optimal value (y-value)

= 9

Therefore the vertex is (5,9).

Last Week we found the solutions of factors or factored form of a quadratic.

We can use the solutions to find the vertex shown above. In addition, the solutions are your x-intercepts on the graph labeled in the above diagram.

Graphing from Factored Form:

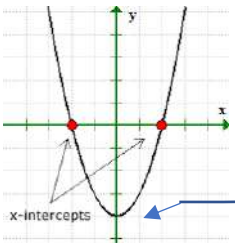
First find the x-intercepts. These are the zeroes of the factors. In other words what makes each factor equal zero.

Example: $y = x^2 - 4$

$x^2 - 4 = 0$

$(x+2)(x-2) = 0$

$x = -2 \quad and \quad x = 2$ These are the 2 x-intercepts



Second find the vertex, what we did above.

$$h = \frac{2+(-2)}{2} = 0$$

$y = x^2 - 4$

$k = y = 0^2 - 4 = -4$

so the vertex is $(0, -4)$

Step 3 would be to connect the 3 dots in a parabolic curve as shown above. That is a basic graph of a parabola.

Parts of a Parabola:

1. Where are the x-intercepts of any graph located?
2. What is the lowest or highest point on a parabola called?
3. Can you think of a time where the graph of a parabola will NOT have two x-intercepts?
4. Algebraically the x-intercepts are what of a quadratic function?

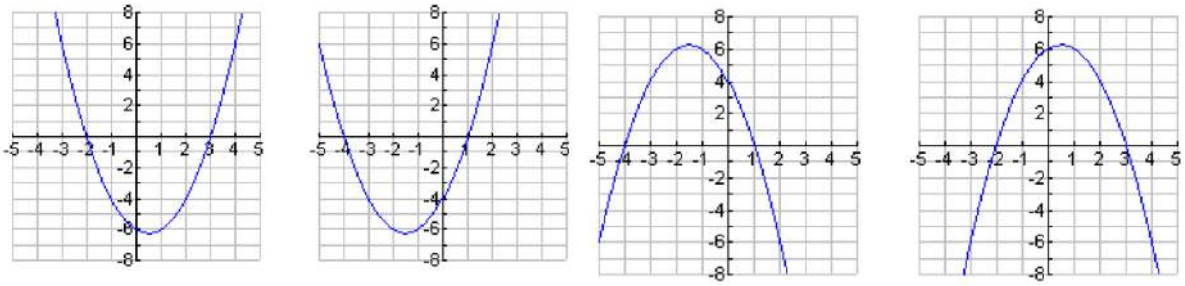
Determine the vertex of each parabola.

1. $y = (x + 4)(x + 12)$
2. $y = 8(x - 5)(x + 9)$
3. $y = (x - 7)(x - 1)$
4. $y = -0.5(x - 1)(x + 7)$
5. $y = 2(x - 2)(x - 4)$
6. $y = 3x(x - 2)$

Graphing Quadratic Functions from their factored form:

Match each equation to its graph.

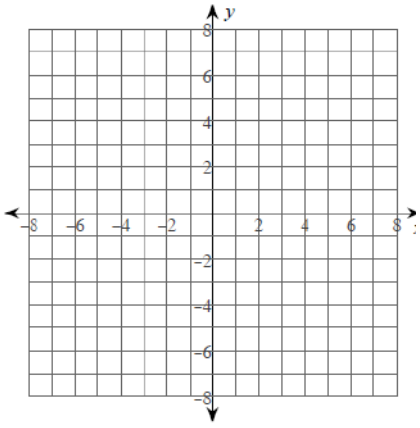
Graph A **Graph B** **Graph C** **Graph D**



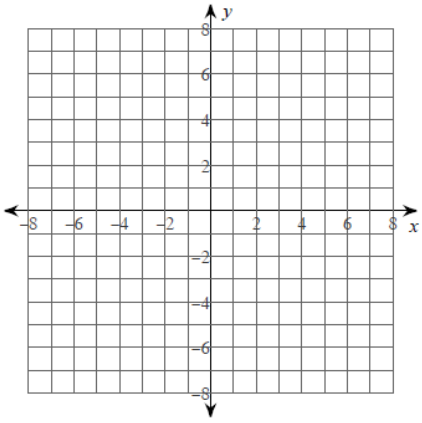
1) $y = -(x+4)(x-1)$
2) $y = (x+2)(x-3)$
3) $y = (x+2)(x-3)$
4) $y = -(x+2)(x-3)$

Graph the following parabolas. (please do the calculations on a separate sheet of paper)

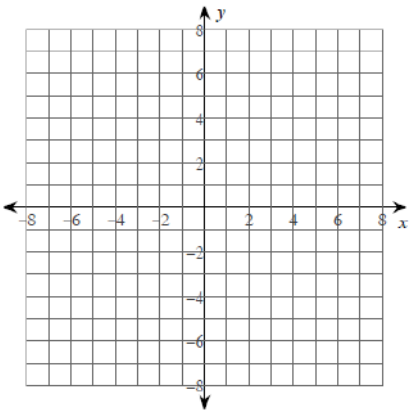
1) $f(x) = (x - 1)(x + 3)$



3) $f(x) = (x + 5)(x + 1)$



4) $f(x) = -(x - 4)(x - 2)$



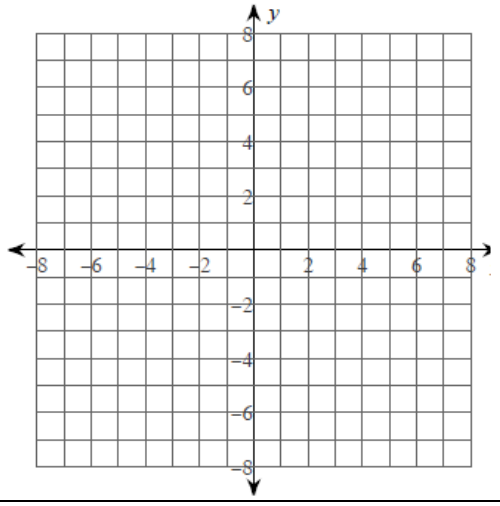
Summary Assignment Week 3

Determine the vertex for each parabola.

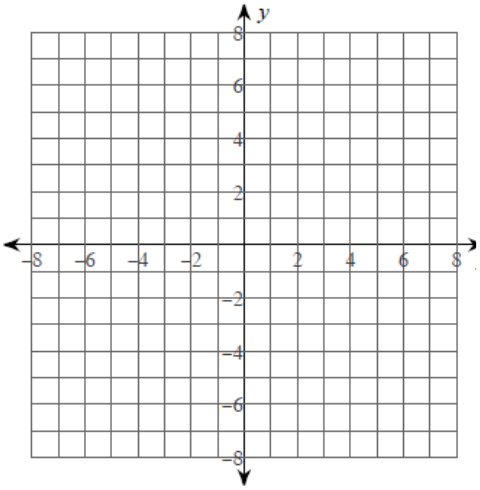
1. $y=(x+1)(x+3)$	2. $y=(x+3)(x-5)$
3. $y=(x-4)^2$	4. $y=-(x-4)(x+2)$

Graph each parabola, having found the vertex for them in #'s 1-4.

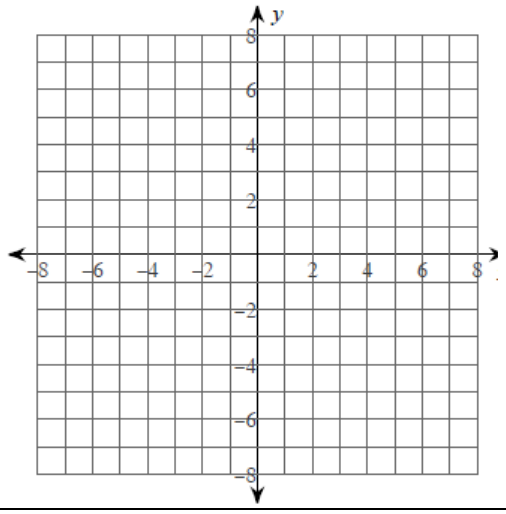
5. $y=(x+1)(x+3)$



6. $y=(x+3)(x-5)$



7. $y=(x-4)^2$



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