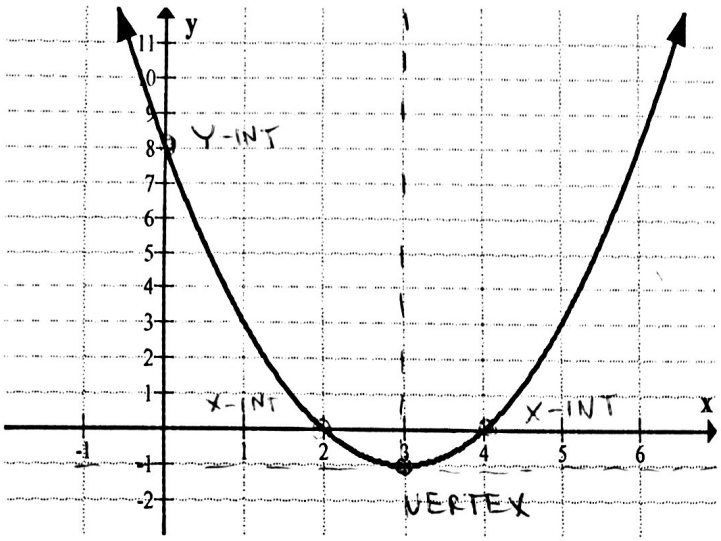
1) Identify all the key parts of the following parabola:

a)



Vertex	(3, −1)
Axis of Symmetry	x = 3
Optimal Value	y = −1
x-intercepts	(2, 0) & (4, 0)
y-intercept	(0, 8)
Direction of Opening	↑

VERTEX

2) Using your knowledge of vertex form, graph the following quadratic relations.

a) $y = (x-2)^2 + 1$

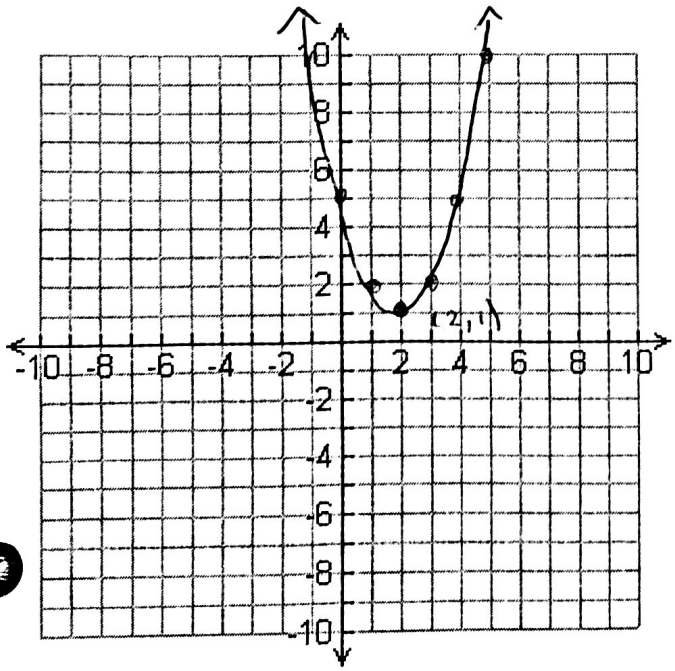
Vertex: (2, 1)

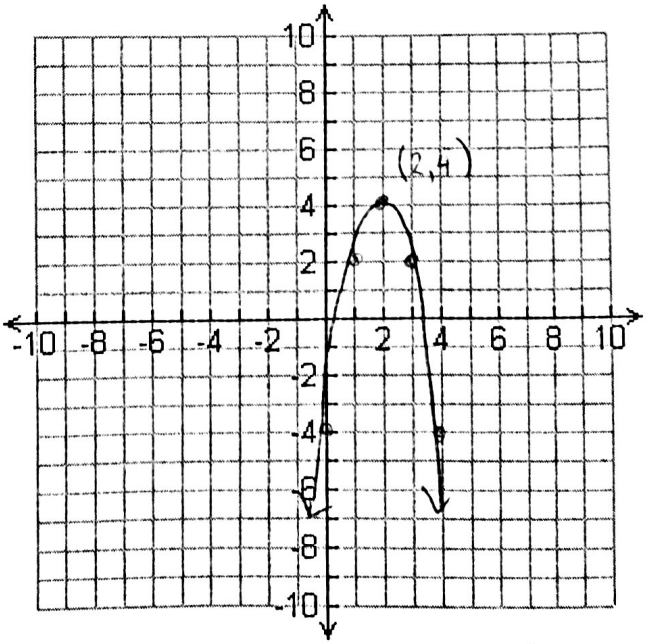
Step Pattern: 1, 3, 5

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

Vertex: (2, 4)

Step Pattern: −2, −6, −10





3) The following equations are all in vertex form: $y = a(x-h)^2 + k$. Complete the table.

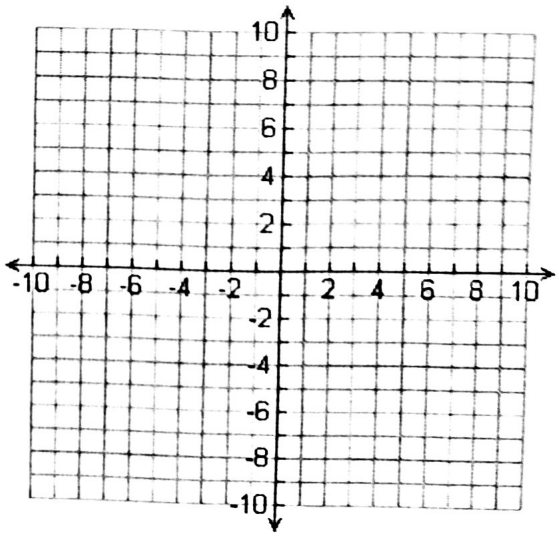
Equation	Vertex	Step Pattern	
$y = (x-2)^2 + 3$	(2, 3)	1, 3, 5	
$y = 2(x-3)^2 + 4$	(3, 4)	2, 6, 10	2(1, 3, 5)
$y = 0.5(x+1)^2 - 4$	(-1, -4)	0.5, 1.5, 2.5	0.5(1, 3, 5
$y = 10(x+4)^2 + 0$	(-4, 0)	10, 30, 50	10(1, 3, 5)

4) The following equations are all in factored form: $y = a(x-s)(x-t)$. Complete the table.

Equation	Zeros (x-intercepts)	Step Pattern
$y = (x-4)(x-6)$	(4, 0) & (6, 0)	1, 3, 5
$y = 3(x+5)(x+1)$	(-5, 0) & (-1, 0)	3, 9, 15
$y = 0.1(x-2)(x-3)$	(2, 0) & (3, 0)	0.1, 0.3, 0.5
$y = 1000(x+100)(x-20)$	(-100, 0) & (20, 0)	1000, 3000, 5000

5) Do you think that you could draw the parabola above? $y = (x-4)(x-6)$

- Plot the zeros
- Draw the axis of symmetry
- Reason out where the vertex must be
- Finish the graph!



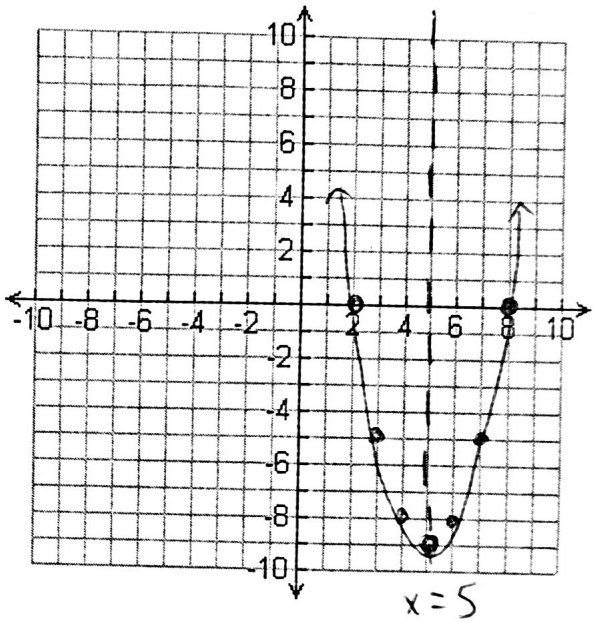
Sketching From Factored Form | MFM2P

Today we will cement our new knowledge of factored form by sketching. Our strategy will be like the warm-up:

- Plot the zeros
- Find the axis of symmetry
- Use the axis of symmetry to find the vertex
- Finish the graph

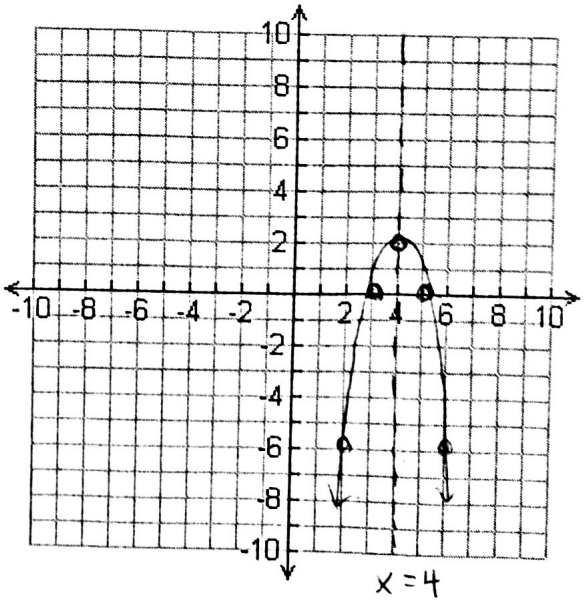
Example: Sketch the following relation on the grids provided

$y = (x-2)(x-8)$
Zeros: (2, 0) & (8, 0)
Axis of Symmetry: $x = 5$
Find the vertex: Plug in $x=5$ $y = (5-2)(5-8)$ $= (3)(-3)$ $= -9$



Let's do one where the value of "a" is not 1.

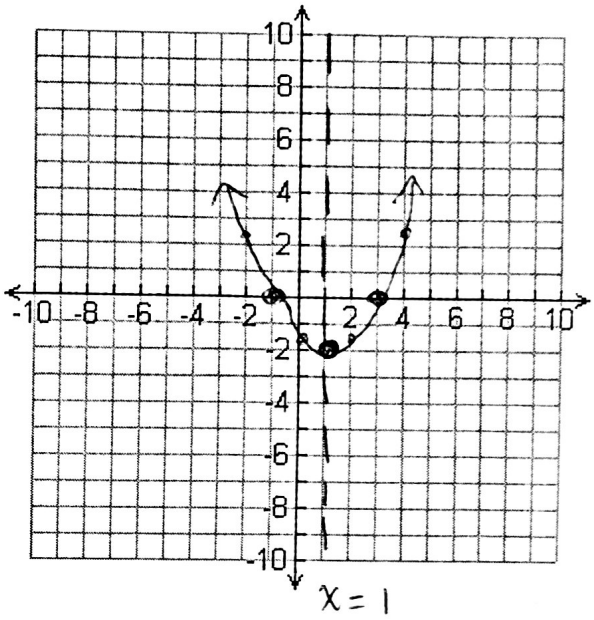
$y = -2(x-3)(x-5)$
Zeros: (3, 0) & (5, 0)
Axis of Symmetry: $x = 4$
Find the vertex: Plug in $x=4$ $y = -2(4-3)(4-5)$ $= -2(1)(-1)$ $= 2$



You try one!

0.5, 1.5, 2.5

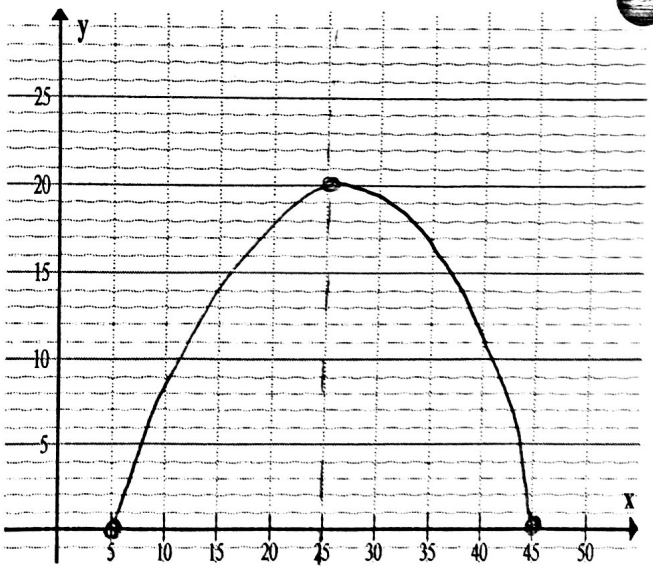
$y = 0.5(x+1)(x-3)$
Zeros: $(-1, 0)$ & $(3, 0)$
Axis of Symmetry: $x = 1$
Find the vertex: Sub in $x = 1$ $y = 0.5(1+1)(1-3)$ $= 0.5(2)(-2)$ $= -2$



An application:

A football is punted from the 5 yard line, and lands on the 45 yard line on the same side of the field. An equation that models the flight of the ball is given by...

$y = -0.05(x-5)(x-45)$
Zeros: $(5, 0)$ & $(45, 0)$
Axis of Symmetry: $x = 25$
Find the vertex: Sub in $x = 25$ $y = -0.05(25-5)(25-45)$ $= -0.05(20)(-20)$ $= 20$



The game is being played in an indoor dome, where the ceiling is 25m high. Will the ball hit the roof?

No, the football only reaches 20m high.