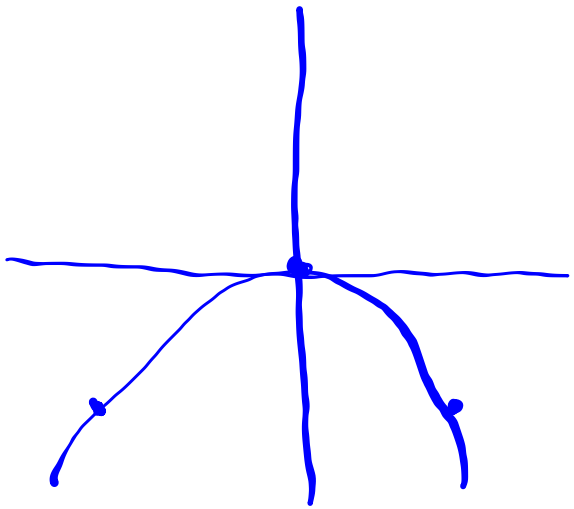
Homework Review - 10.1

$y = -\frac{1}{5}x^2$

- reflection
- vertical shrink

$y = x^2$



x	y
0	0
5	-5
-5	-5

$-\frac{1}{5}(5)^2$

$-\frac{1}{5} \cdot 25$

$\frac{-25}{5} = -5$

$-\frac{1}{5}(-5)^2$

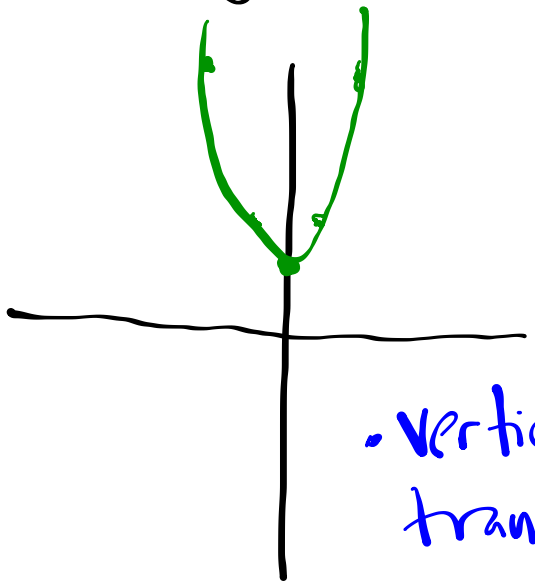
$-5 \cdot -5 = 25$

$-\frac{1}{2} \cdot 25$

$-\frac{1}{5}x^2$ when $x=5$

$-\frac{1}{5}(5)^2 = -\frac{1}{5}\cdot 25 = \frac{-25}{5} = -5$

$y = x^2 + \frac{7}{4}$

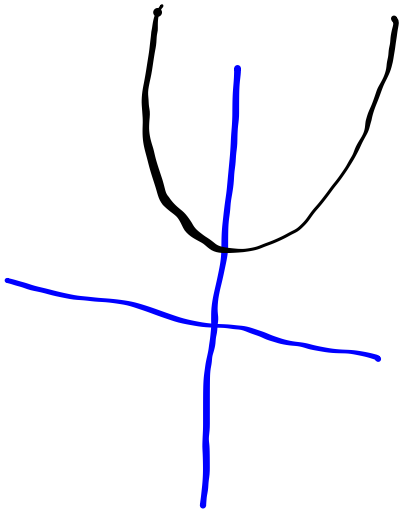


- vertical translation

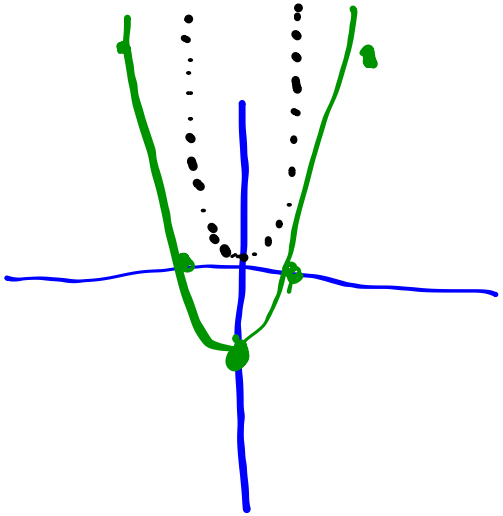
x	y	
0	$\frac{7}{4}$	$1\frac{3}{4}$
1	$\frac{11}{4}$	$2\frac{3}{4}$
-1	$\frac{11}{4}$	$2\frac{3}{4}$
2	$\frac{23}{4}$	$5\frac{3}{4}$
-2	$\frac{23}{4}$	$5\frac{3}{4}$

$\frac{4}{4} + \frac{7}{4} = \frac{11}{4}$

$\frac{16}{4} + \frac{7}{4} = \frac{23}{4}$



$y = \frac{3}{4}x^2 - 3$



- vertical shrink
- translation

x	y
0	-3
2	0
-2	0
4	9
-4	9

$(-1,9)\ (0,3)$

$y = ax^2 + 3$

$9 = a(-1)^2 + 3$

$9 = a + 3$

$-3 \quad -3$

$a = 6$

$y = ax^2 + c$

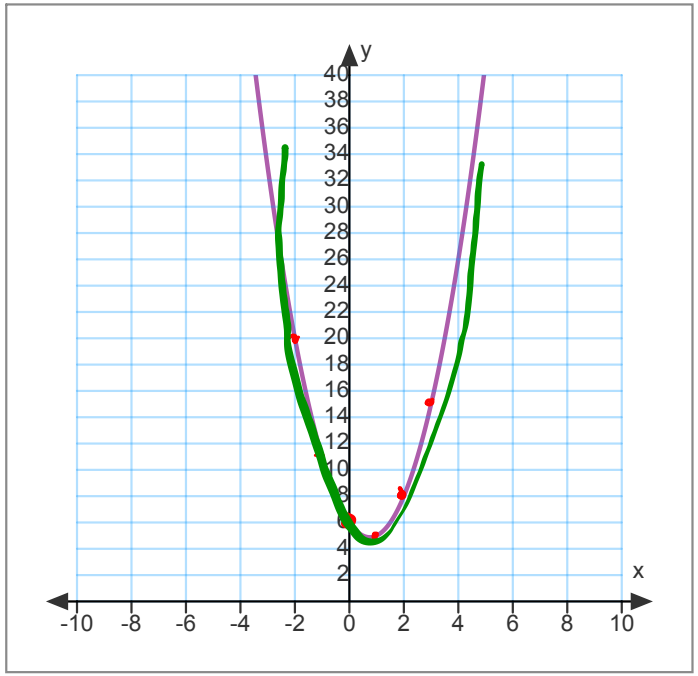
$3 = a(0)^2 + c$

$3 = 0 + c$

$3 = c$

$\boxed{y = 6x^2 + 3}$

Graphing Quadratics - $y = ax^2 + bx + c$



What will it look like?

$$y = 2x^2 - 3x + 6$$

x	y
0	6
1	5
-1	11
2	8
-2	20
3	15

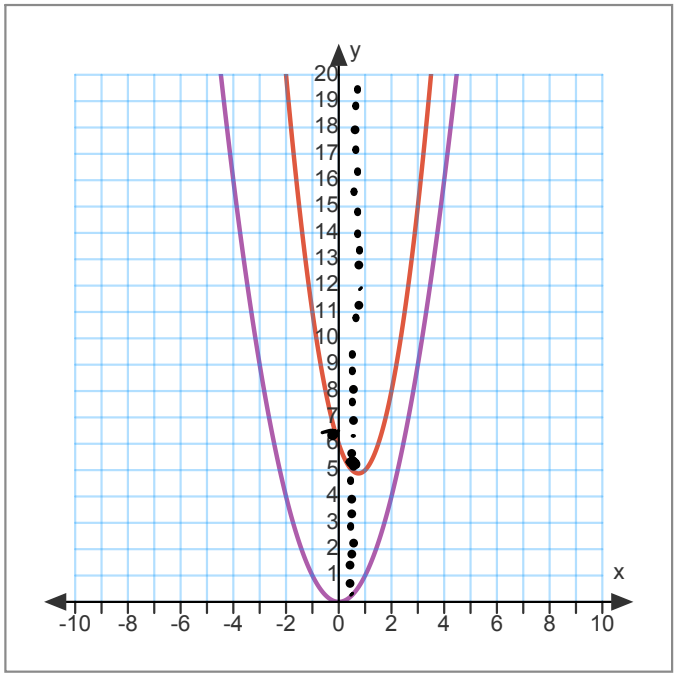
General Guidelines:

$y = ax^2 + bx + c$

$y = 2x^2 - 3x + 6$

$-1 \quad -2 \quad +6$

$\frac{9}{8} \quad -\frac{18}{8} \quad +\frac{48}{8}$



Does it open up or down? (Smiley or Frowny)

if a is negative, it's frowny...

Is it narrower or wider than the parent function?

if $|a| < 1$, it's wider (vertical stretch)

Where is the axis of symmetry?

$$x = \frac{-b}{2a} = \frac{3}{4}$$

Where is the vertex?

use this x and find y using the equation $(\frac{3}{4}, 5)$

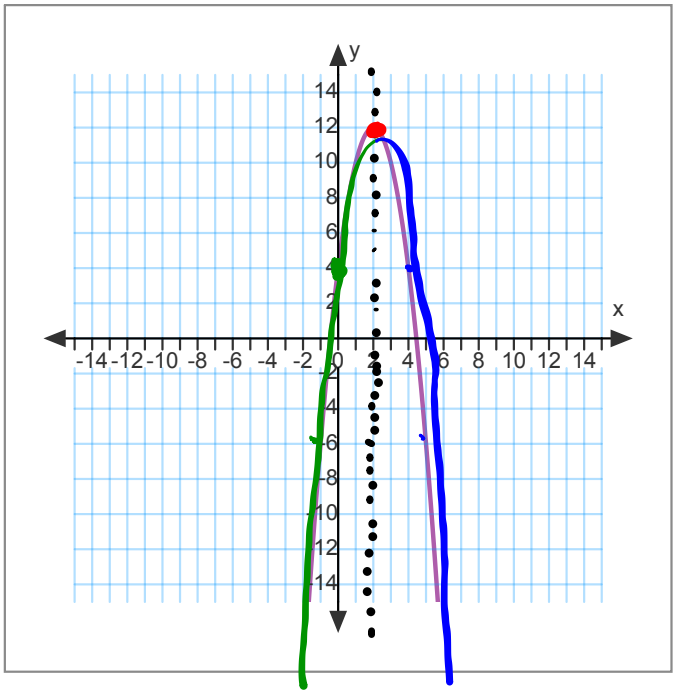
Where is the y-intercept?

use $x = 0$ and find y using the equation

$y = x^2$

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

$y = -2x^2 + 8x + 4$



smile frown

1. Determine whether the graph opens up or down

DOWN

2. Find and sketch the axis of symmetry

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

3. Find and plot the vertex

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

$= -8 + 16 + 4 = 12$ (2,12)

4. Plot two points - the y-intercept and one other point (on the same side of the parabola)

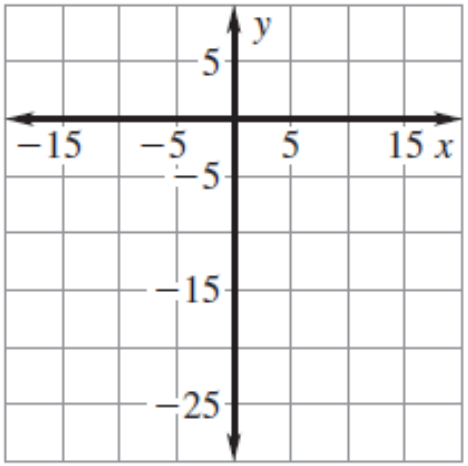
$y = -2(-1)^2 + 8(-1) + 4$

x	y
0	4
-1	-6

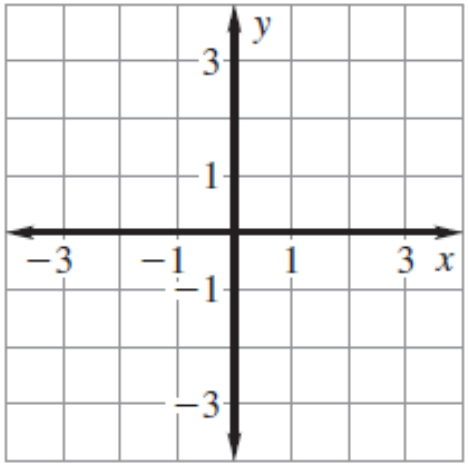
5. Reflect the other side of the parabola ✓

6. Draw the curve ✓

$y = -x^2 - 10$



$y = -2x^2 + 2x + 1$



Finding the maximum or minimum of a quadratic

If the graph opens up, it has a minimum.
If the graph opens down, it has a maximum.

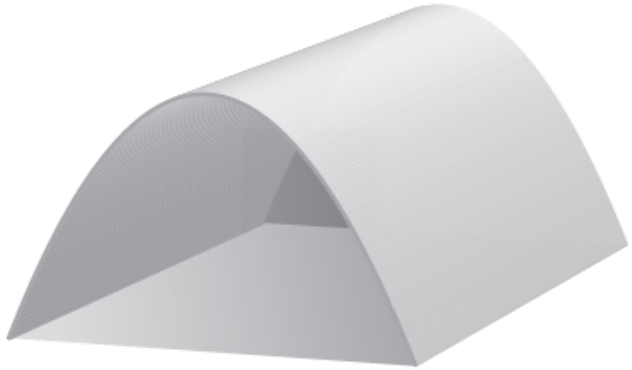
Find the vertex and identify it as a minimum or maximum:

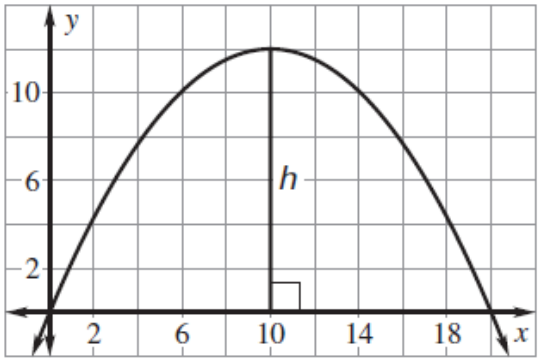
$$y = -\frac{1}{2}x^2 + 2x - 4$$

32. $f(x) = 8x^2 - 40$

33. $f(x) = -5x^2 + 10x - 2$

Storage Building The storage building shown can be modeled by the graph of the function $y = -0.12x^2 + 2.4x$ where x and y are measured in feet. What is the height h at the highest point of the building as shown in the diagram?





Homework:

p. 638, 3-11 odd, 15-24 by 3, 28-34 by 3, 40, 41

tonight