Homework Review - 10.1

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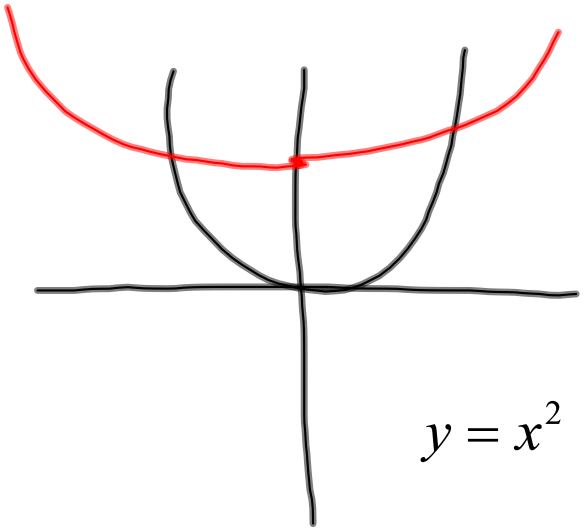
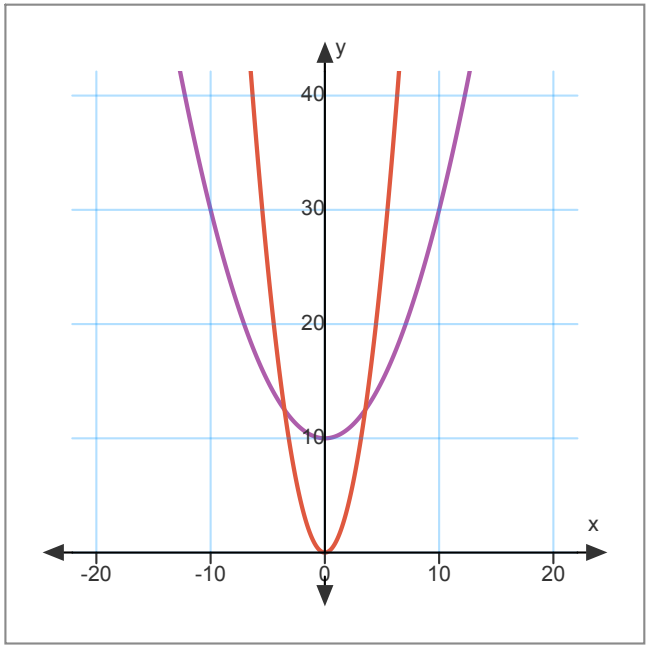
$$y = \frac{1}{5}x^2 + 10$$





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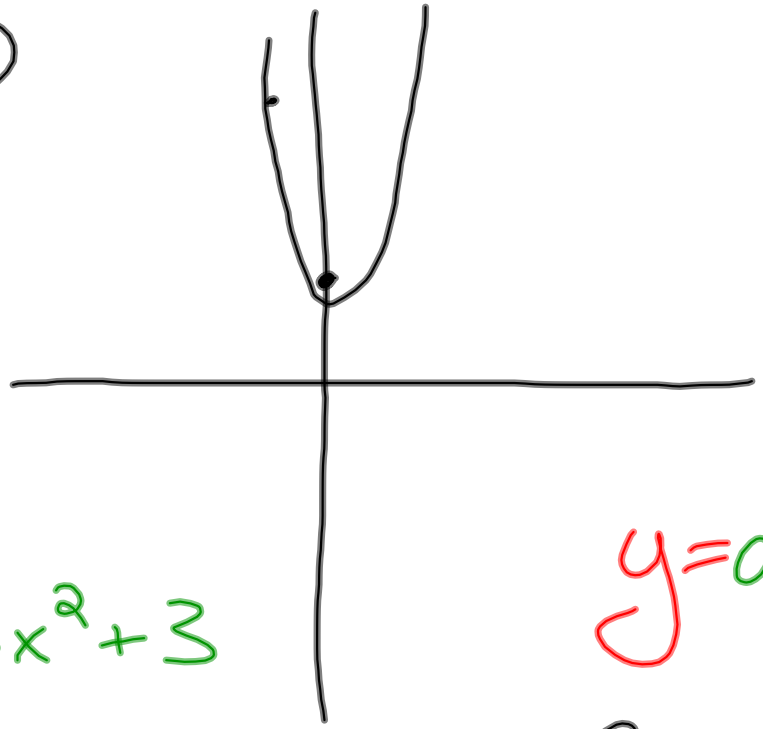


$y = 6x^2 + 3$

$y = ax^2 + 3$

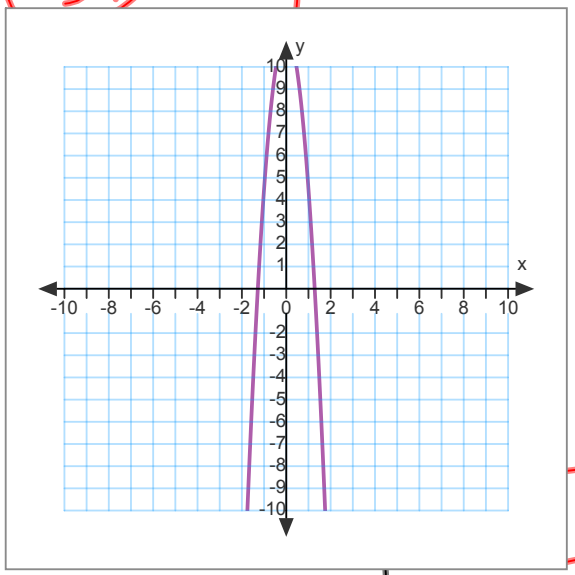
$9 = a(-1)^2 + 3$

$9 = a + 3$

$-3 \quad -3$

$a = 6$

(39)



$y = -7x^2 + (+11.5)$

$y = (-7)x^2 + 11.5$

$y = ax^2 - c$

$4.5 = a(1^2) - c$

$4.5 = a - c$

$-16.5 = a(-2)^2 - c$

$-16.5 = 4a - c$

$4.5 = a - c$

$+16.5 = 4a + c$

$\frac{21}{-3} = \frac{-3a}{-3}$

$a = -7$

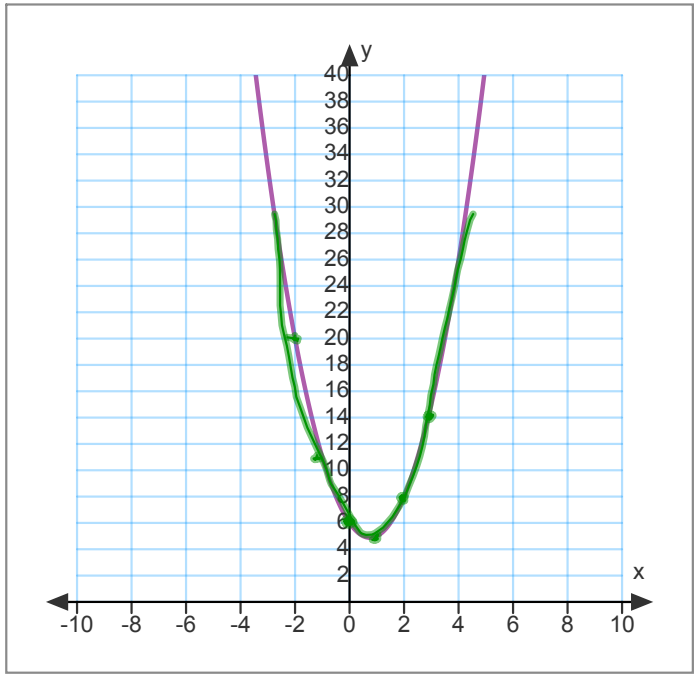
$4.5 = -7 - c$

$+7 \quad +7$

$(-1)11.5 = -c(-1)$

$-11.5 = c$

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



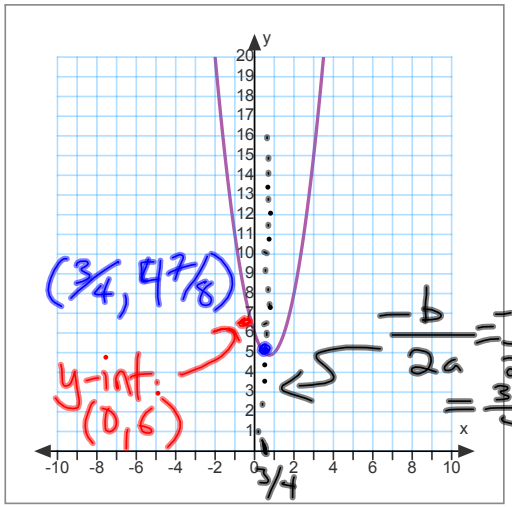
What will it look like?

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

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

General Guidelines:

$$y = ax^2 + bx + c$$
$$y = 2x^2 - 3x + 6$$



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

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

$a > 0$: up $\quad a < 0$: down

Is it narrower or wider than the parent function?

$-1 < a < 1$: wider

Where is the axis of symmetry?

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

Where is the vertex?

x coord. $= \frac{-b}{2a}$

y coord. = plug x into eq.

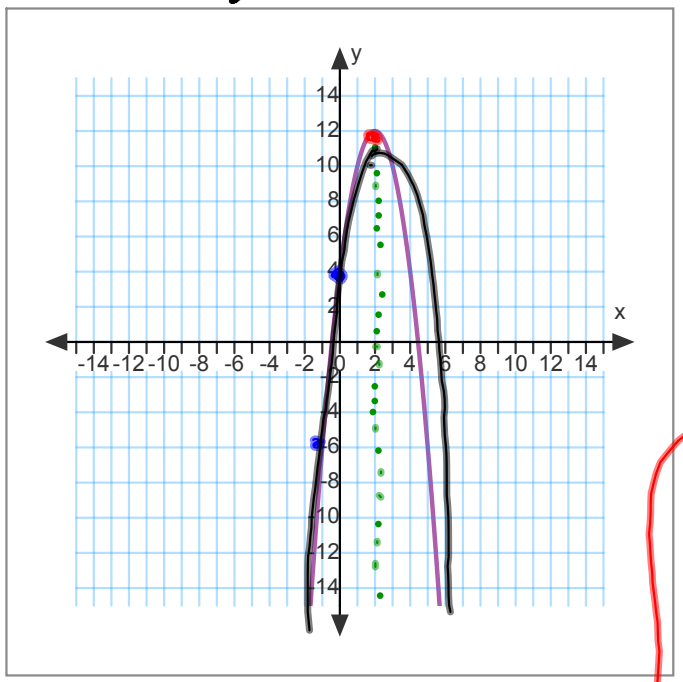
Where is the y-intercept?

$\boxed{c}$

$$y = 2\left(\tfrac{3}{4}\right)^2 - 3\left(\tfrac{3}{4}\right) + 6$$
$$= 2\left(\frac{9}{16}\right) - \frac{9}{4} + 6$$
$$= \frac{18}{16} - \frac{36}{16} + \frac{96}{16}$$
$$= \frac{78}{16} = \frac{39}{8} = 4\frac{7}{8}$$

$$\begin{array}{r} {}^{3}16 \\ 6 \\ \hline 96 \\ -18 \\ \hline 78 \end{array}$$

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



1. Determine whether the graph opens up or down

$a < 0$

2. Find and sketch the axis of symmetry

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

3. Find and plot the vertex

$(2, 12)$

$y = -2(2)^2 + 8(2) + 4$
$= -8 + 16 + 4 = 12$

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

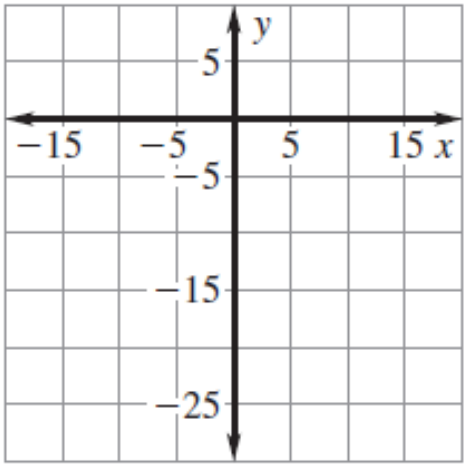
x	y
0	4
-1	6

5. Reflect the other side of the parabola

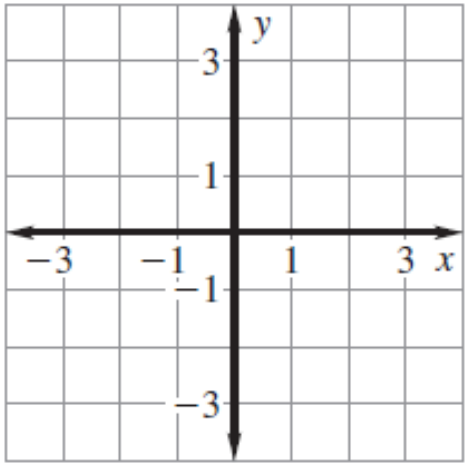
6. Draw the curve

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

$y = -x^2 - 10$



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



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:

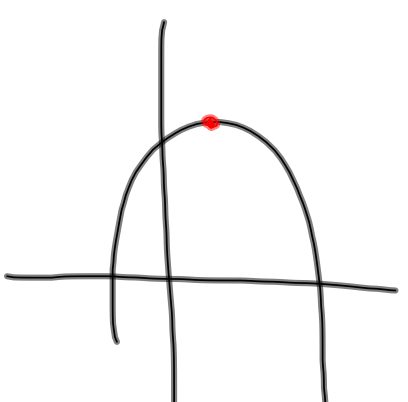
$y = -\frac{1}{2}x^2 + 2x - 4$ (-2) maximum

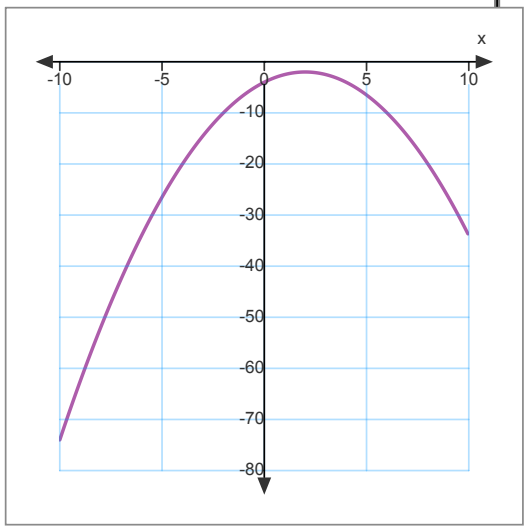
$x = \frac{-b}{2a} = \frac{-2}{2(-\frac{1}{2})} = \frac{-2}{-1} = 2$

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

$= -2 + 4 - 4$

$= -2$





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

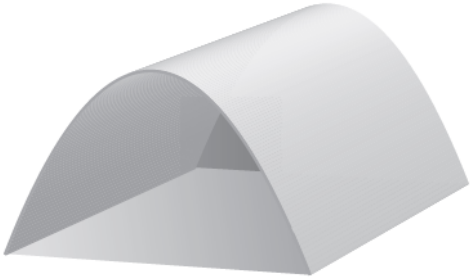
33. $f(x) = -5x^2 + 10x - 2$

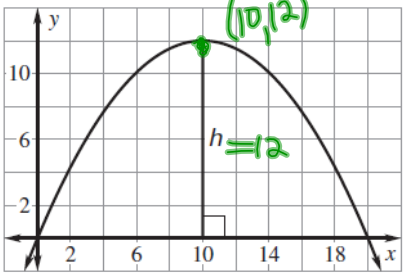
$y = 8x^2 - 40$

$\Downarrow$

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

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?





X=10
y=12

$$x = \frac{-b}{2a} = \frac{-2.4}{2(-0.12)} = \frac{+2.4}{+0.24} = 10$$

$$y = -0.12x^2 + 2.4x$$
$$= -0.12(10)^2 + 2.4(10)$$
$$= -0.12(100) + 24$$
$$= -12 + 24$$
$$= \boxed{12}$$

Homework:

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