

Algebra 2 4.7

Write a quadratic function in vertex form

Transform quadratic functions

quadratic

vertex

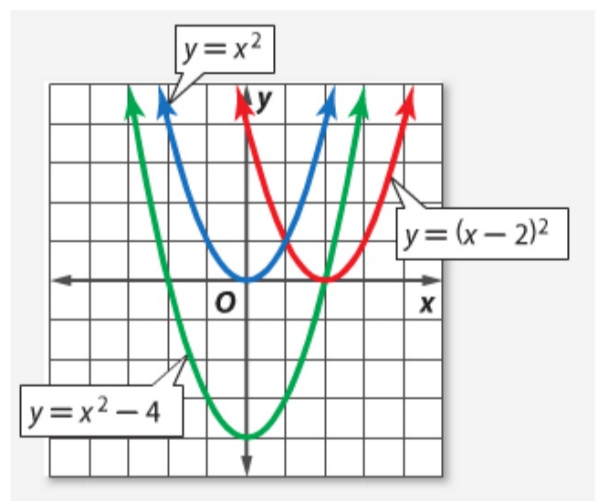
completing the square

vertex form

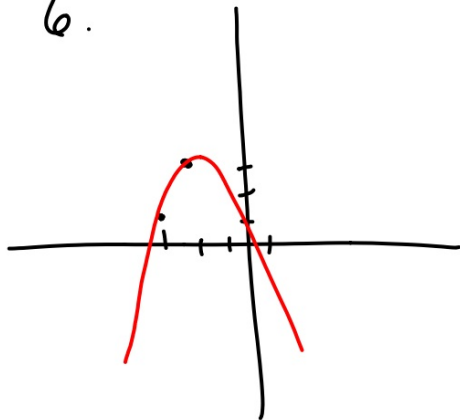
parent graph

transformation (Ch. 2.7)

$$y = a(x - h)^2 + k$$



6.



$$y = -\frac{1}{2} \left(x + \frac{2}{2} \right)^2 + 3$$

$$1 = a(-4+2)^2 + 3$$

$$1 = a \underset{-2 \cdot -2}{(-2)^2} + 3$$

$$\underset{-3}{1} = \underset{-3}{4a + 3}$$

$$\underset{4}{-2} = \underset{4}{\frac{4a}{4}} \quad a = \underset{2}{-\frac{1}{2}}$$

Write each function in vertex form.

Identify the vertex.

$$1. y = x^2 + 6x + 2$$

$-2 \qquad -2$

$$2. y = -2x^2 + 8x - 5$$

$-5 \qquad -2 \quad -2 + 5$

$$y - 2 = x^2 + 6x + 9$$

$+9$

$$y + 7 = (x + 3)^2$$

$-7 \qquad -7$

$$y = (x + 3)^2 - 7$$

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

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

$+8$

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

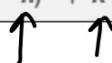
From Ch. 2.7...

ConceptSummary Transformations of Quadratic Functions



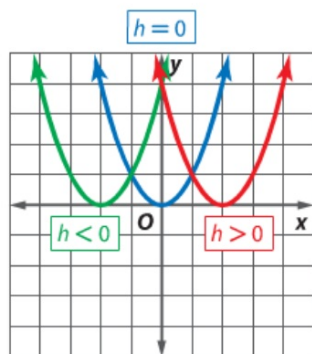
$x - 3$

$$f(x) = a(x - h)^2 + k$$



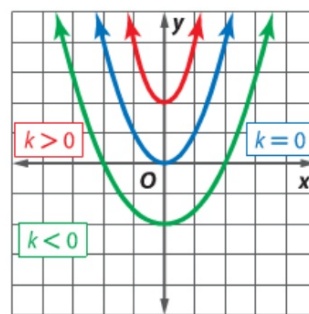
h , Horizontal Translation

h units to the right if h is positive
 $|h|$ units to the left if h is negative



k , Vertical Translation

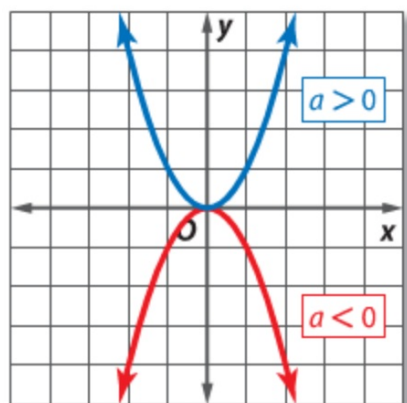
k units up if k is positive
 $|k|$ units down if k is negative



a , Reflection

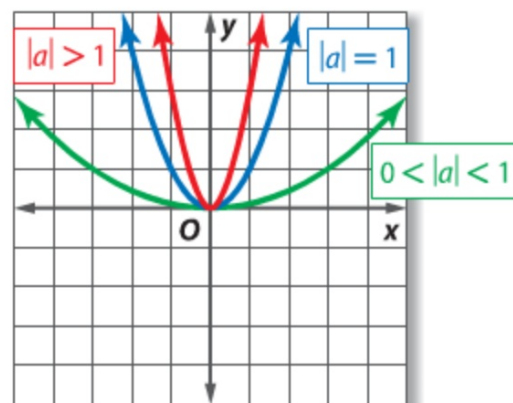
If $a > 0$, the graph opens up.

If $a < 0$, the graph opens down.



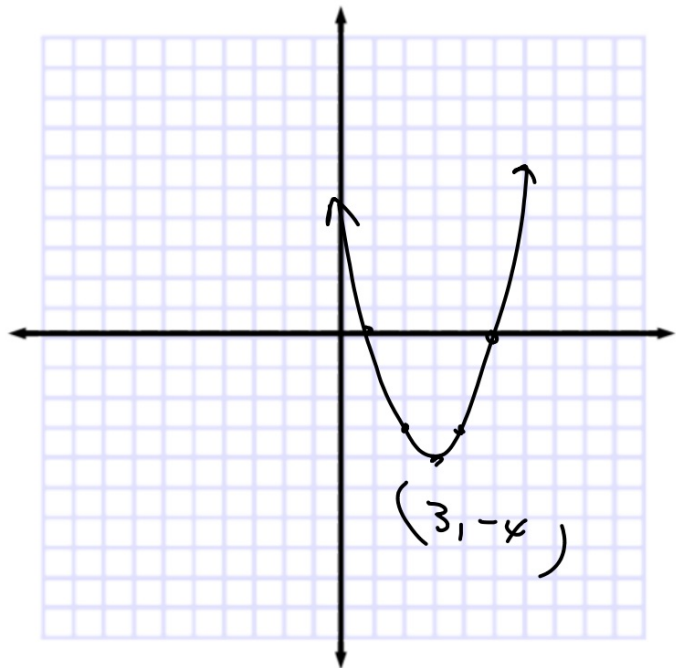
a , Dilation

If $|a| > 1$, the graph is stretched vertically. If $0 < |a| < 1$, the graph is compressed vertically.



Graph each function.

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



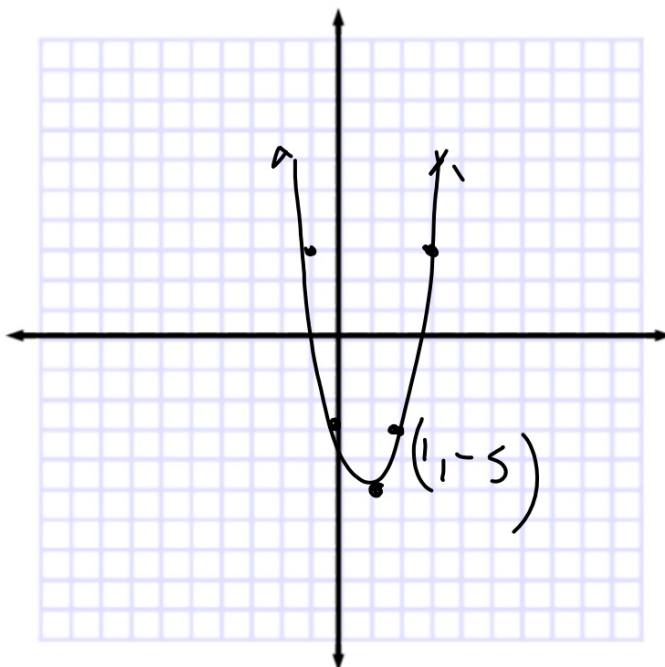
14. $y = 2x^2 - 4x - 3$
 $+3 \quad +3$

Write equation in vertex form and graph
 Parent graph?

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

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

$$y = 2(x-1)^2 - 5$$



15. $y = 3x^2 + 10x$ $\frac{10}{3} \cdot \frac{1}{2} = \frac{10}{6}$

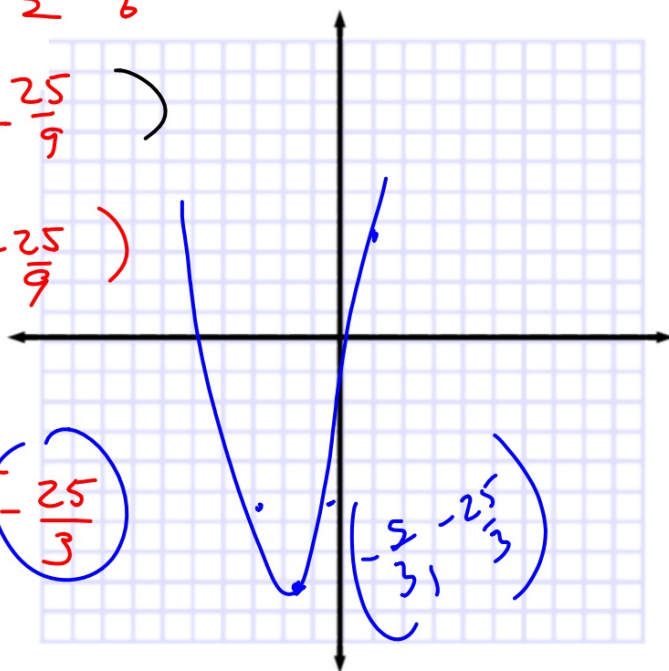
$$y = \frac{3}{1} \left(x^2 + \frac{10}{3}x + \frac{25}{9} \right)$$

$$\frac{75}{9} \quad 3 \left(x + \frac{10}{3}x + \frac{25}{9} \right)$$

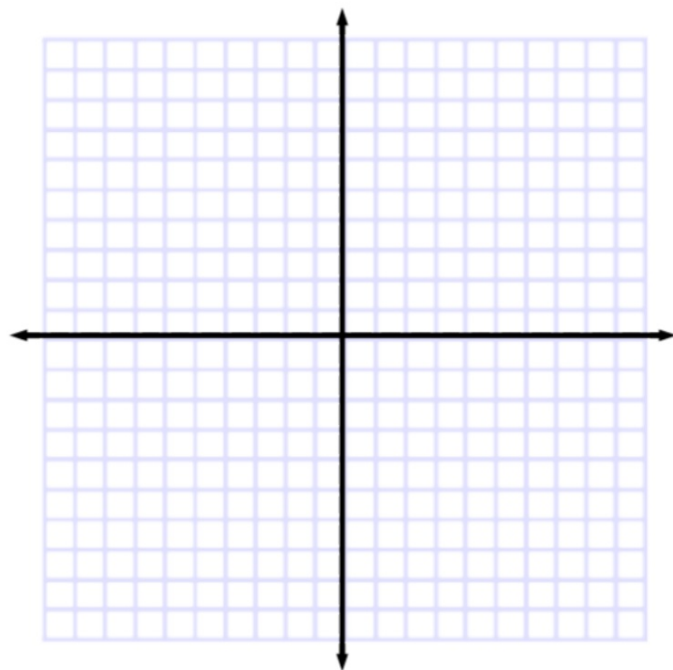
$\frac{5}{3} \cdot \frac{5}{3} =$

$$y = 3 \left(x + \frac{5}{3} \right)^2 - \frac{25}{3}$$

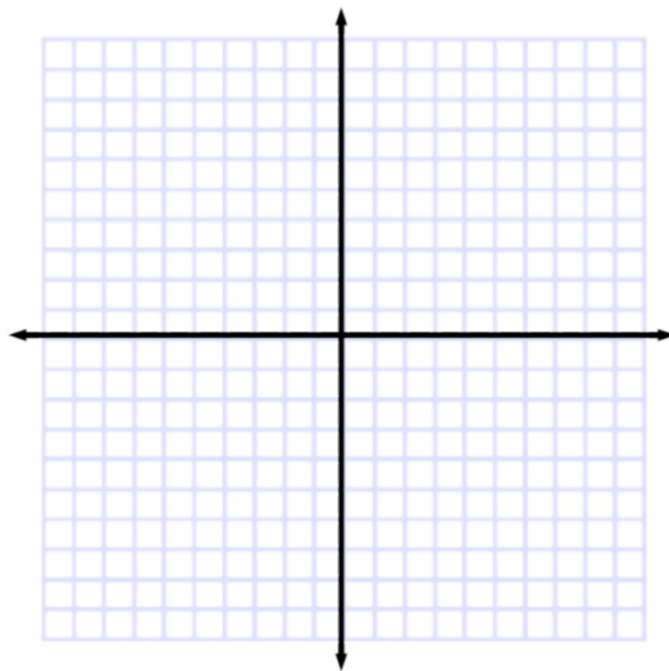
$-1\frac{2}{3}, -8\frac{1}{3}$



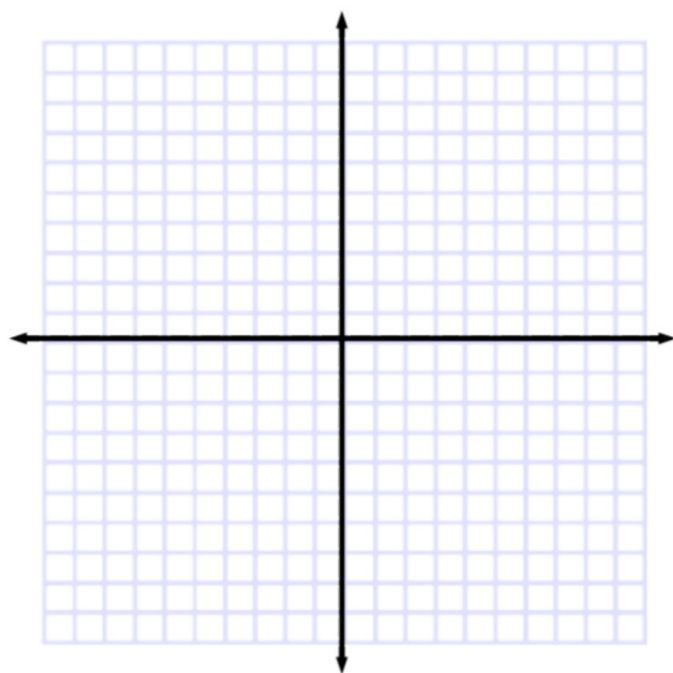
3. $y = 4x^2 + 24x + 24$



6. $y = -2x^2 + 5$



7. $y = \frac{1}{2}(x + 6)^2 - 8$



3B. $y = 0.25(x + 1)^2$

