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

Algebra 2 4.7

Write a quadratic function in vertex form

Transform quadratic functions

quadratic

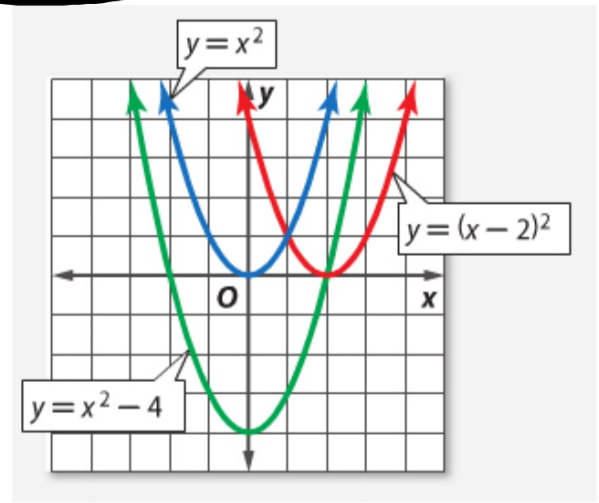
vertex

completing the square

vertex form

parent graph

transformation (Ch. 2.7)



Write in vertex form, identify the vertex.
(x,y)

GuidedPractice

1A. $y = x^2 + 4x + 6$

$-6 \quad -6$

y-int = c
= 6

$y - 6 = x^2 + 4x + 4$

$+4$

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

$+2 \quad +2$

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

$x - -2$

y-int (0,6)

V (-2,2)

AOS x = -2

opens up

Write in vertex form, identify the vertex.

1B. $y = 2x^2 - 12x + 17$

$-17 \qquad -17$

$y - 17 = 2(x^2 - 6x + 9)$

$+18$

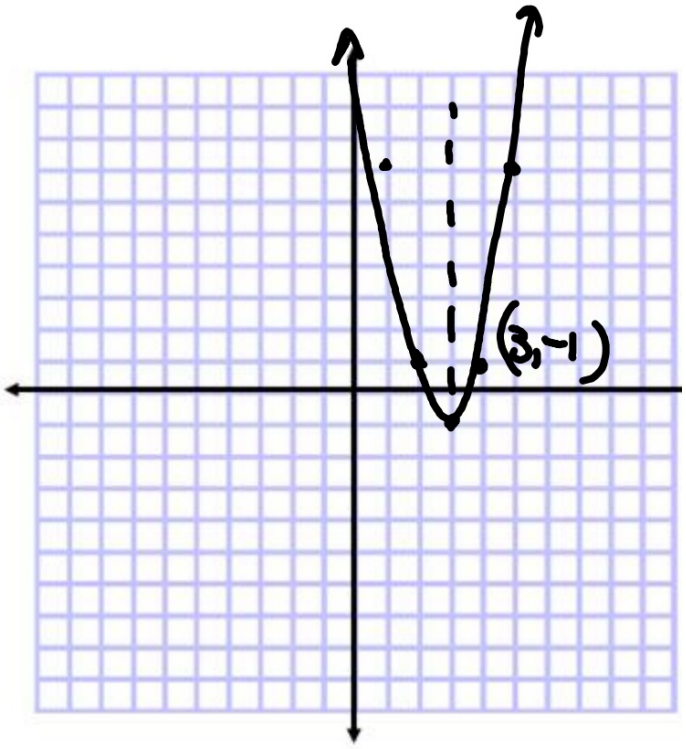
$x - 3$

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

-1

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

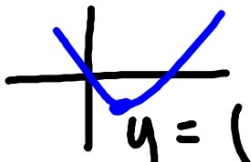
-1



Write each function in vertex form. Identify the vertex.

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

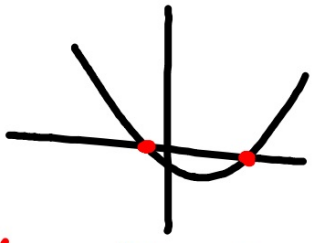
2. $y = -2x^2 + 8x - 5$



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

$y = (x-3)(x-1)$ f.f. x-int

$y = x^2 - 4x + 3$ gf y-int



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

$y - 3 = x^2 - 4x + 4$

$+4$

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

$y = (x-2)^2 - 1$ vf vertex

(CTS)

From Ch. 2.7...

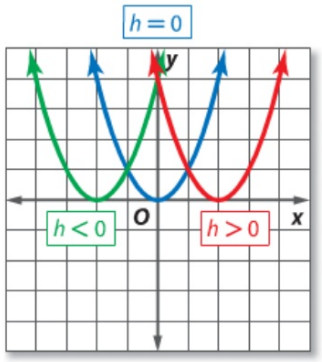
ConceptSummary Transformations of Quadratic Functions

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

h, Horizontal Translation

h units to the right if h is positive

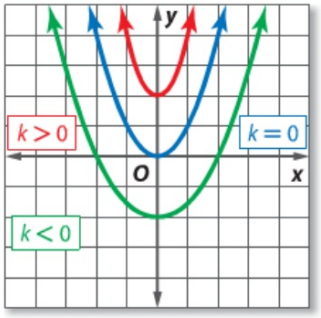
$|h|$ units to the left if h is negative



k, Vertical Translation

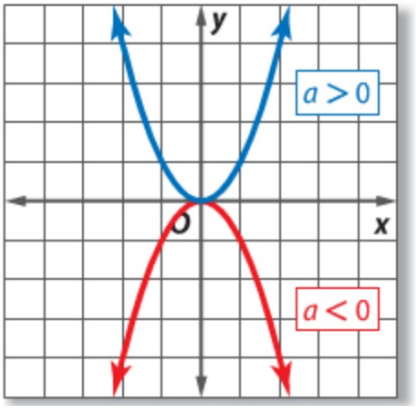
k units up if k is positive

$|k|$ units down if k is negative



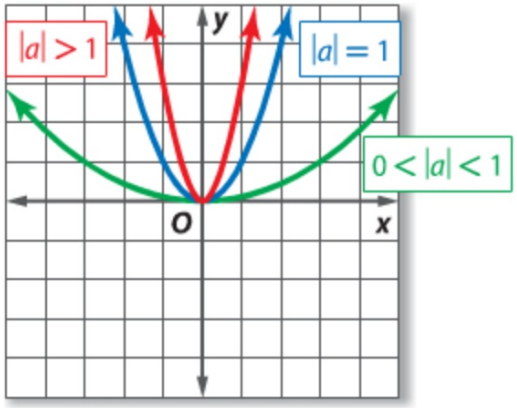
***a*, Reflection**

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



***a*, Dilation**

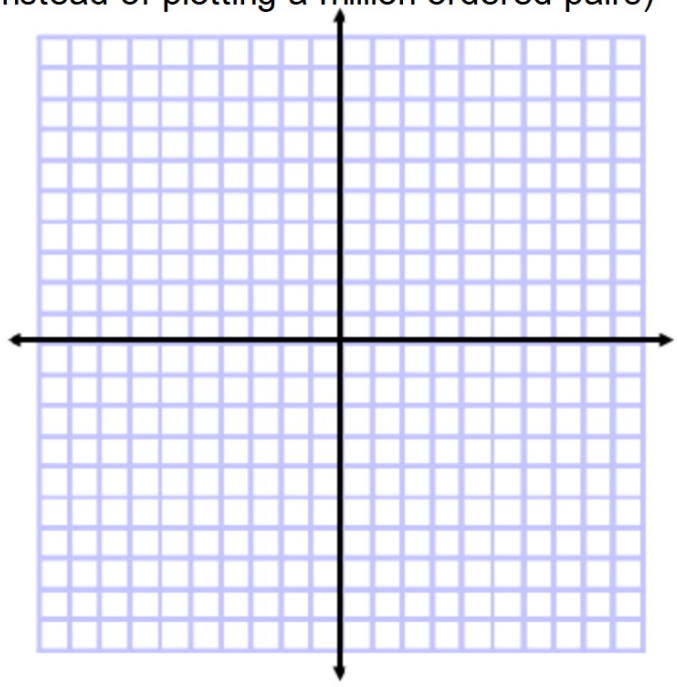
If $|a| > 1$, the graph is stretched vertically. If $0 < |a| < 1$, the graph is compressed vertically.



Graph: use parent graph (instead of plotting a million ordered pairs)

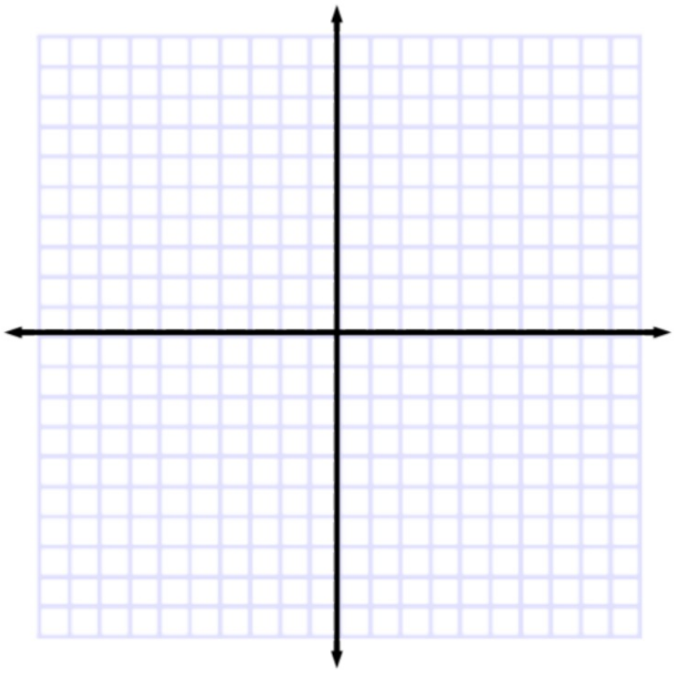
GuidedPractice

3A. $y = (x - 3)^2 - 2$



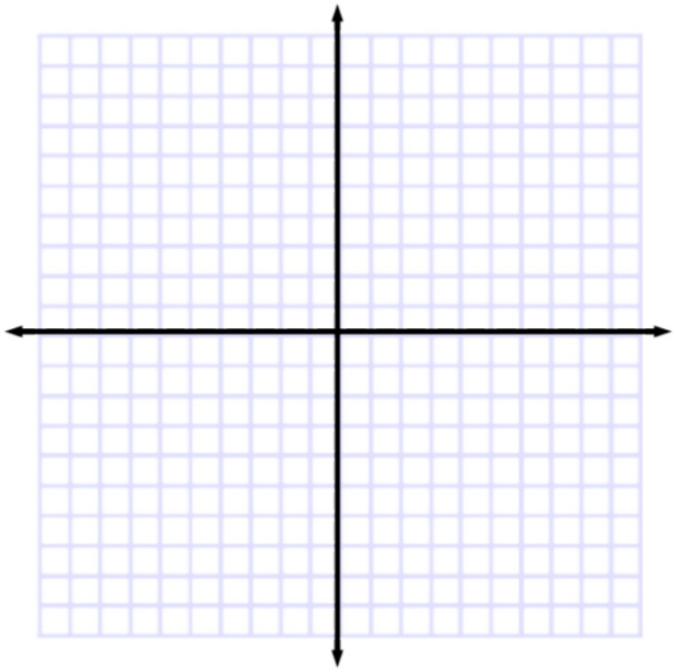
Graph each function.

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

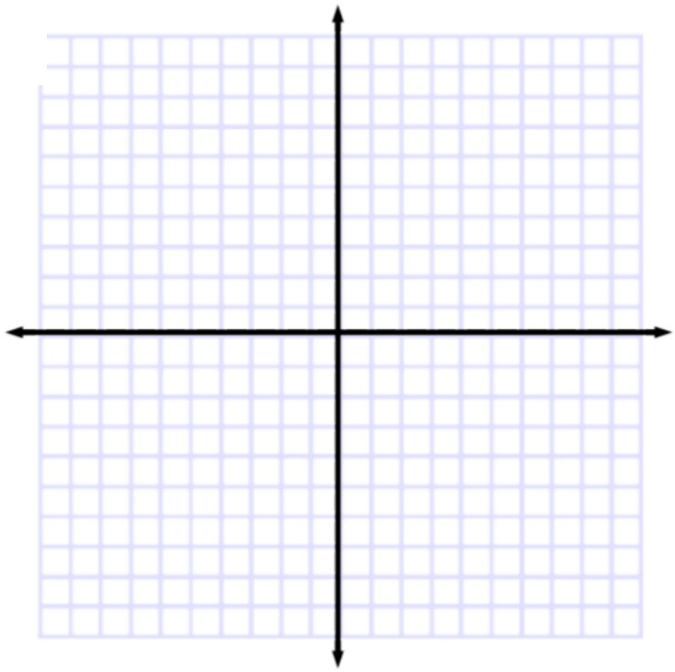


14. $y = 2x^2 - 4x - 3$

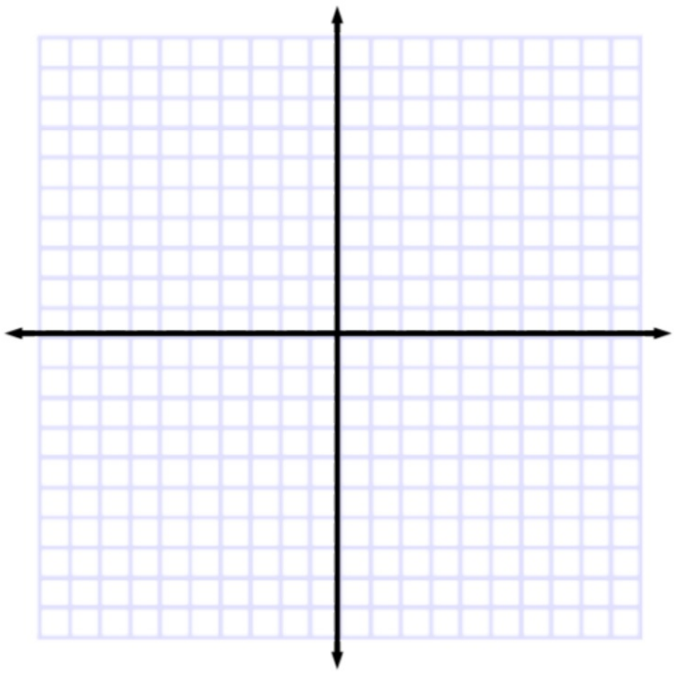
Write equation in vertex form and graph
Parent graph?



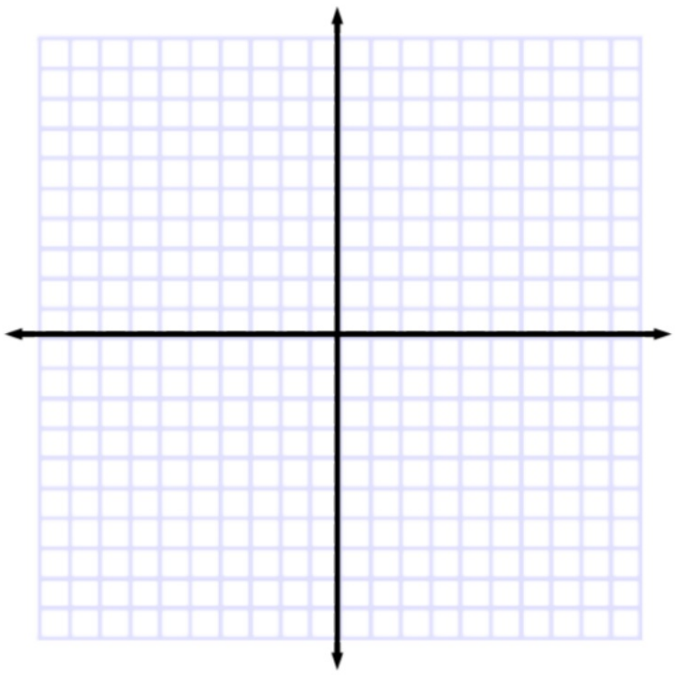
15. $y = 3x^2 + 10x$



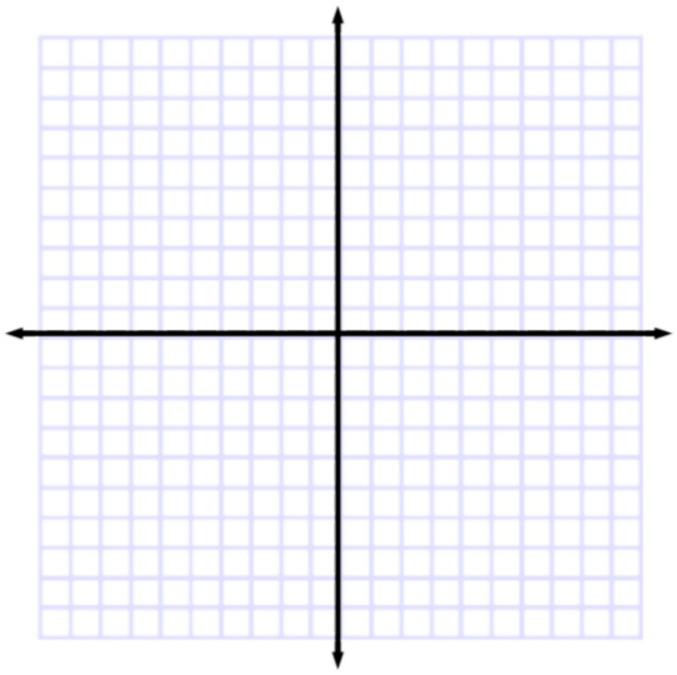
3. $y = 4x^2 + 24x + 24$



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



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



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