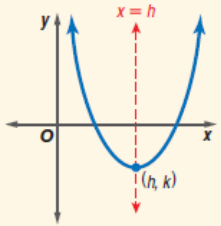
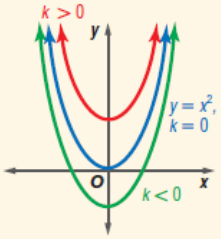
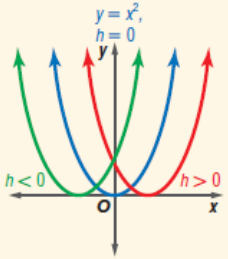
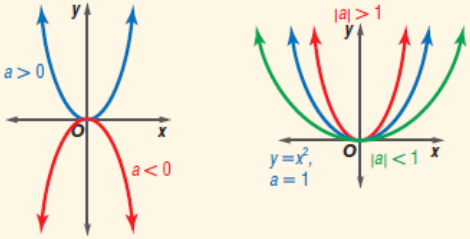
CONCEPT SUMMARY — Quadratic Functions in Vertex Form

The vertex form of a quadratic function is $y = a(x - h)^2 + k$.

h* and *k	***k***
Vertex and Axis of Symmetry 	**Vertical Translation** 
h	***a***
Horizontal Translation 	**Direction of Opening and Shape of Parabola** 

Vertex Form

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

vertex (h, k)

axis: $x = h$

max/min: k

$h = 2 \quad k = 3$

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

right

$h = -2 \quad k = 3$

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

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

ex.1 $y=(x+2)^2+1$

$a=1$
$h=-2$
$k=1$

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

$(x-(-2))$

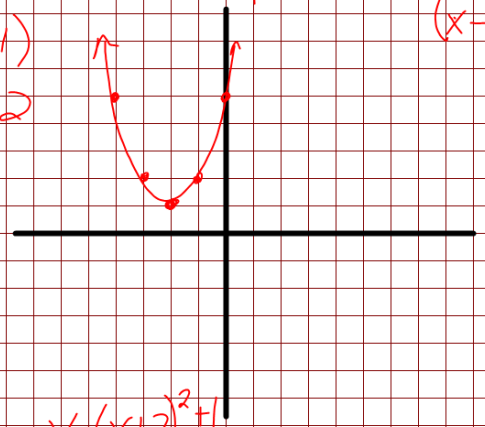
vertex $(-2,1)$

axis: $x=-2$

opens: up

min: 1

X	Y
-4	5
-3	2
-2	1
-1	2
0	5



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

ex.2

A. $y=-2.5x^2$

B. $y=-0.3x^2$

C. $y=2.5x^2$

D. $y=5x^2$

widest = B

narrow = D

Check your progress #2

F. $y=-0.1x^2$

G. $y=1x^2$

H. $y=0.5x^2$

J. $y=2.3x^2$

narrow $\longrightarrow$ widest

J, G, H, F

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

ex. 3a

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

$y = (x^2 + 8x) - 5$

$y = (x^2 + 8x + \underline{16}) - 5 - \underline{16}$

$\frac{8}{2} = 4$

$4^2 = 16$

$\boxed{y = (x+4)^2 - 21}$

$a = 1$
$h = -4$
$k = -21$

ex. A

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

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

$y = (x^2 - 4x + \underline{4}) + 6 - \underline{4}$

$\frac{-4}{2} = -2$

$(-2)^2 = 4$

$\boxed{y = (x-2)^2 + 2}$

$a = 1$
$h = 2$
$k = 2$

ex. B

$y = 2x^2 + 12x + 17$

$y = (2x^2 + 12x) + 17$

$y = 2(x^2 + 6x + \underline{9}) + 17 - \underline{2(9)}$

$\frac{6}{2} = 3$

$3^2 = 9$

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

$a = 2$
$h = -3$
$k = -1$

ex 3b

$y = -3x^2 + 6x - 1$

$y = (-3x^2 + 6x) - 1$

$y = -3(x^2 - 2x + \underline{1}) - 1 - \underline{(-3)(1)}$

$+3(1)$

$\frac{-2}{2} = -1$

$(-1)^2 = 1$

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

$a = -3$
$h = 1$
$k = 2$

p. 290-292			
14-16, 21-24, [illegible], 33-35, 41-42, 50, 54, 59-60			