4-7B Vertex Form - shortcut

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

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

$y + 5 + 16 = x^2 + 8x + 16$

$y + 21 = (x + 4)^2$

$y = (x + 4)^2 - 21$

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

$4 - 16 - 5$

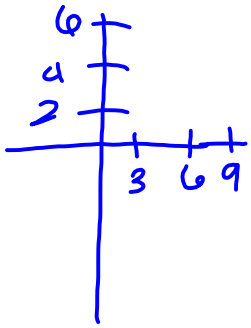
$y = (x^2 + 8x + 16) - 5 - 16$

$y = (x + 4)^2 - 21$

V(-4, -21), X = -4

translated 4 units left, 21 down

x	y
-8	-5
-6	-17
-4 (V)	-21
-2	-17
0	-5



2. $y = x^2 - 6x + 15$

$y = (x^2 - 6x + 9) + 15 - 9$

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

V(3, 6) X = 3

3. $y = 2x^2 - 16x + 5$

$y = 2(x^2 - 8x + 16) + 5 - 32$ (+32)

$y = 2(x-4)^2 - 27$

$V(4, -27)$ $X=4$

$\frac{y}{2} = \frac{2x^2 - 16x + 5}{2}$

$\frac{y}{2} = x^2 - 8x + \frac{5}{2}$

$\frac{y}{2} - \frac{5}{2} + \frac{32}{2} = x^2 - 8x + 16$

$\frac{y}{2} + \frac{27}{2} = (x-4)^2$, $\frac{y}{2} = (x-4)^2 - \frac{27}{2}$

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

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

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

$V(1, 2)$ $X=1$

translated 1 right, 2 up.

reflected over the x-axis.

stretched vertically.

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

$\frac{y}{-3} = \frac{-3x^2 + 6x - 1}{-3}$

$\frac{y}{-3} = x^2 - 2x + \frac{1}{3}$

$\frac{y}{-3} - \frac{1}{3} + 1 = x^2 - 2x + 1$

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

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

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

4-7 Worksheet

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

$y = x^2 - 5$

$y = (x - 0)^2 - 5$