

SOLUTIONS...

Algebra 1

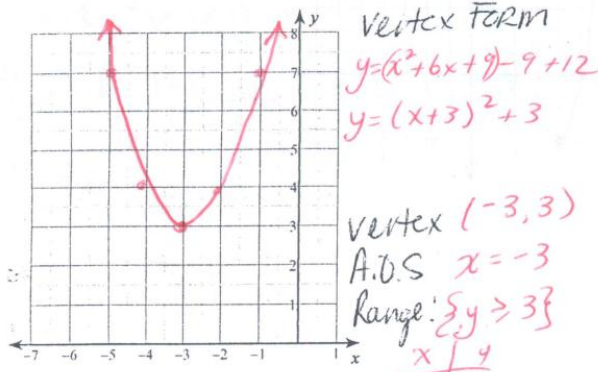
Name Key ID: 1

Assignment

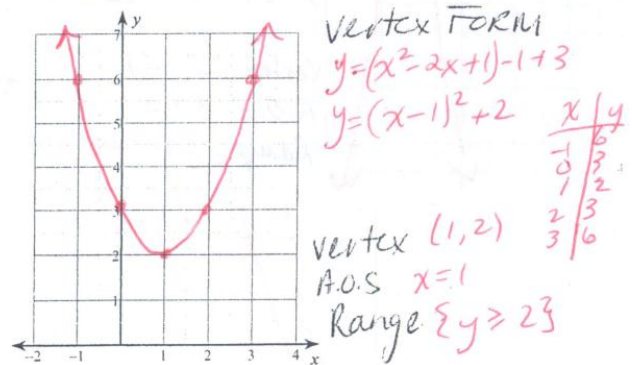
Date _____ Period _____

Sketch the graph of each function.

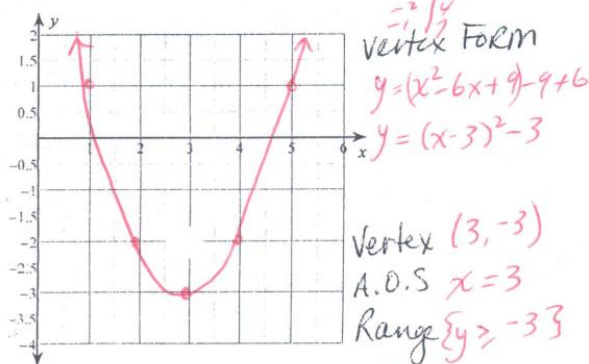
1) $y = x^2 + 6x + 12$



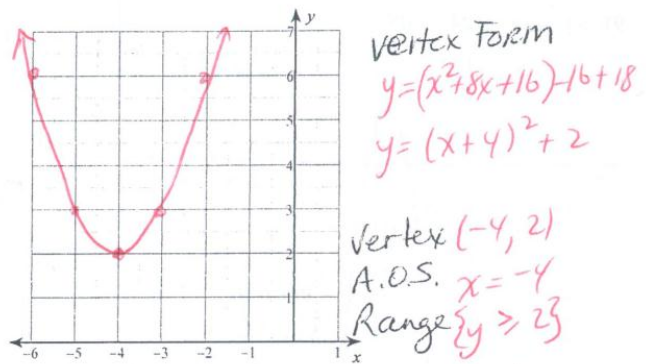
2) $y = x^2 - 2x + 3$



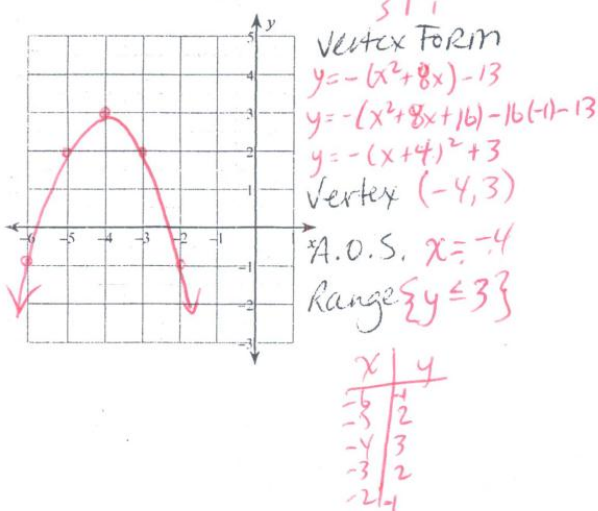
3) $y = x^2 - 6x + 6$



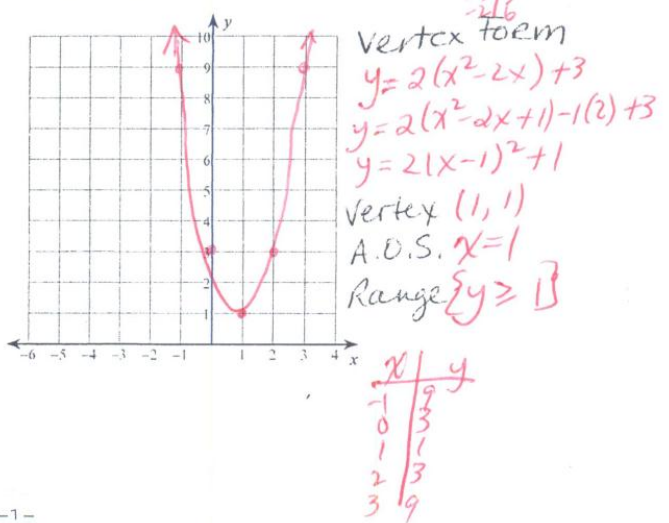
4) $y = x^2 + 8x + 18$



5) $y = -x^2 - 8x - 13$



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



Questions

VERTEX $y = a(x-h)^2 + k$
 Max/Min
 A.O.S. D/R
 vertex, sketch

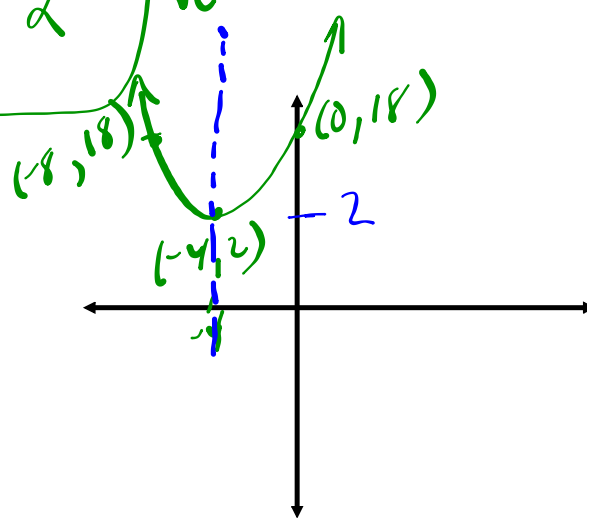
(4) $y = x^2 + 8x + 18$ ← $\left[\begin{array}{l} a=1 \\ y_{int} (0,18) \end{array} \right.$

$y = (x^2 + 8x + 16) - 16 + 18$

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

vertex $(-4, 2)$

A.O.S $\Rightarrow x \geq -4$
 R: $y \geq 2$



|

⑤

$$y = -x^2 - 8x - 13$$

$$\underline{-1}y = \underline{-1}x^2 - \underline{-1}8x + \underline{-1}16 - \underline{-1}16 - \underline{-1}13$$

$$-y = (x^2 + 8x + 16) - 16 + 13$$

$$\underline{-1}y = \underline{-1}(x+4)^2 - \underline{-1}3$$

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

Examples: S → V: Complete the square with "a ≠ 1".

#1. $y = 4x^2 - 24x$

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

$y = 4(x^2 - 6x + 9) - 9(4)$

$y = 4(x - 3)^2 - 36$ vertex (3, -36)

#2. $y = -3x^2 + 12x + 10$

$y = -3(x^2 - 4x) + 10$

$y = -3(x^2 - 4x + 4) - 4(-3) + 10$

$y = -3(x - 2)^2 + 22$

vertex (6, 10)

vertex (2, 22)

your TURN...

$y = 4x^2 - 24x + 12$

$y = 4(x^2 - 6x) + 12$

$y = 4(x^2 - 6x + 9) - 9(4) + 12$

$y = 4(x - 3)^2 - 24$

vertex (-24)
(3,)

#3. $y = -5x^2 - 15x + 9$ ← vertex $(0, 9) \left(\frac{3}{2}\right)^2$

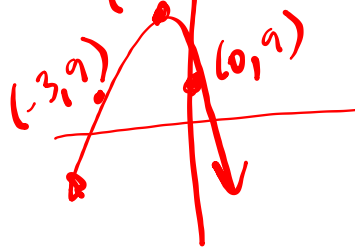
$$y = -5(x^2 + 3x) + 9$$

$$y = -5\left(x^2 + 3x + \frac{9}{4}\right) - \frac{9}{4}(-5) + \frac{9 \cdot 4}{4}$$

$$y = -5\left(x + \frac{3}{2}\right)^2 + \frac{45}{4} + \frac{36}{4}$$

$$y = -5\left(x + \frac{3}{2}\right)^2 + \frac{81}{4}$$

vertex $\left(-\frac{3}{2}, \frac{81}{4}\right)$



What about having a fractional 'a' value???

#4. $y = \frac{3}{4}x^2 + 12x - 5$

$y = \frac{3}{4}(x^2 + 16x) - 5$

$y = \frac{3}{4}(x^2 + 16x + 64) - 64\left(\frac{3}{4}\right) - 5$

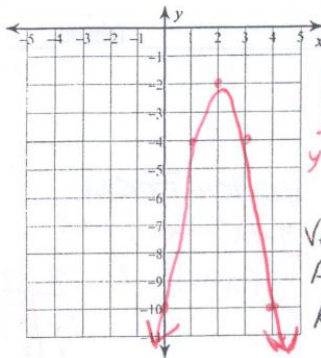
$y = \frac{3}{4}(x + 8)^2 - 48 - 5$

$y = \frac{3}{4}(x + 8)^2 - 53$

Handwritten calculations in green and red:

$$\left. \begin{array}{l} 12 \div \frac{3}{4} \\ \frac{12}{1} \cdot \frac{4}{3} \\ \frac{48}{3} \\ 16 \end{array} \right\}$$

7) $y = -2x^2 + 8x - 10$

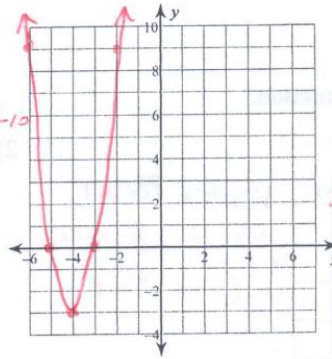


Vertex Form
 $y = -2(x^2 - 4x) - 10$
 $y = -2(x^2 - 4x + 4) - 4(-2) - 10$
 $y = -2(x - 2)^2 - 2$

Vertex $(2, -2)$
 A.O.S. $x = 2$
 Range $\{y \leq -2\}$

x	y
0	-10
1	-4
2	-2
3	-4
4	-10

8) $y = 3x^2 + 24x + 45$

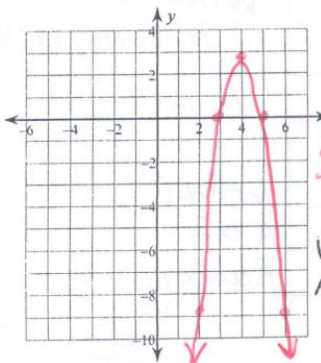


Vertex Form
 $y = 3(x^2 + 8x) + 45$
 $y = 3(x^2 + 8x + 16) - 16(3) + 45$
 $y = 3(x + 4)^2 - 3$

Vertex $(-4, -3)$
 A.O.S. $x = -4$
 Range $\{y \geq -3\}$

x	y
-6	9
-5	0
-4	-3
-3	0
-2	9

9) $y = -3x^2 + 24x - 45$

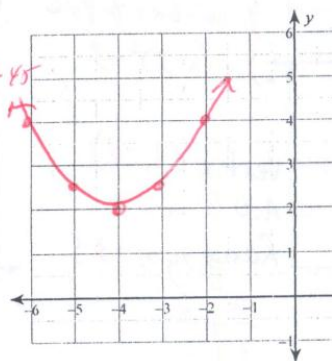


Vertex Form
 $y = -3(x^2 - 8x) - 45$
 $y = -3(x^2 - 8x + 16) - 16(-3) - 45$
 $y = -3(x - 4)^2 + 3$

Vertex $(4, 3)$
 A.O.S. $x = 4$
 Range $\{y \leq 3\}$

x	y
2	-9
3	0
4	3
5	0
6	-9

10) $y = \frac{1}{2}x^2 + 4x + 10$



Vertex Form
 $y = \frac{1}{2}(x^2 + 8x) + 10$
 $y = \frac{1}{2}(x^2 + 8x + 16) - 16(\frac{1}{2}) + 10$
 $y = \frac{1}{2}(x + 4)^2 + 2$

Vertex $(-4, 2)$
 A.O.S. $x = -4$
 Range $\{y \geq 2\}$

x	y
-6	4
-5	2.5
-4	2
-3	2.5
-2	4