

Name: _____
 Date: _____
 Class: _____

Algebra
 Unit 10
 HW 10-6

1) State the vertex of both equations and what you notice about them:

$y = (x-3)^2 + 2$ and $y = x^2 - 6x + 11$.

$(3, 2)$

$(3, 2)$

Same vertex, same eq if expand 2nd eq

2) Place the following equation into vertex form: $y = x^2 - 4x - 1$

$y = x^2 - 4x + 4 - 1 - 4$

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

3) Place the following equation into vertex form: $y = x^2 - 10x + 27$

$y = x^2 - 10x + 25 + 27 - 25$

$-\frac{10}{2} = (-5)^2 = +25$ $y = (x-5)^2 + 2$

4) Get each into vertex form and describe the shift that would move the first equation to the second equation: $y = x^2 + 5x + 4$ and $y = x^2 - 9x - 2$

$y = x^2 + 5x + \frac{25}{4} + 4 - \frac{25}{4}$

$+\frac{5}{2} = \left(\frac{5}{2}\right)^2 = +\frac{25}{4}$

$y = \left(x + \frac{5}{2}\right)^2 - 2.25$

$y = x^2 - 9x + \frac{81}{4} - 2 + \frac{81}{4}$

$-\frac{9}{2} = \left(-\frac{9}{2}\right)^2 = +\frac{81}{4}$

$y = \left(x - \frac{9}{2}\right)^2 + 18.25$

$+20$
up 20

5) Solve: $2x - 108 + x^2 = 1364 + 50x - 2x^2$
 $x^2 - 13x - 1472 = 0$

$$\frac{3x^2}{3} - \frac{48x}{3} - \frac{1472}{3} = 0$$

$$x^2 - 16x + 64 = \frac{1472}{3} + 64$$

$$-\frac{16}{2} = \frac{-(-8)^2}{4} = -16$$

$$\sqrt{(x-8)^2} = \sqrt{\frac{1664}{3}}$$

$$x-8 = \pm \sqrt{\frac{1664}{3}}$$

$$x = 8 \pm \sqrt{\frac{1664}{3}}$$

$$\rightarrow 8 + \sqrt{\frac{1664}{3}} = 31.55$$

$$\rightarrow 8 - \sqrt{\frac{1664}{3}} = -15.55$$

6) Solve: $f(x) = 192 - 8x - 3x^2$ when $f(x) = 40$.

$$40 = 192 - 8x - 3x^2$$

$$-3x^2 - 8x + 152 = 0$$

$$\frac{16}{9} + \frac{152}{3} = x^2 + \frac{8}{3}x + \frac{16}{9}$$

$$x + \frac{4}{3} = \pm \sqrt{\frac{472}{9}}$$

$$0 = \frac{-3x^2}{-3} - \frac{8x}{-3} + \frac{152}{-3}$$

$$0 = x^2 + \frac{8}{3}x + \frac{152}{3}$$

$$\frac{8}{2} = \left(\frac{4}{3}\right)^2 = \frac{16}{9}$$

$$\sqrt{\left(x + \frac{4}{3}\right)^2} = \sqrt{\frac{472}{9}}$$

$$x = -\frac{4}{3} \pm \sqrt{\frac{472}{9}}$$

7) Describe all the transformations $g(x) = x^2$ would go through to become $f(x) = -3(x-6)^2 + 14$

reflect over x axis

stretch vert factor of 3

right 6

up 14