Name: _____
Date: _____
Class: _____

Algebra
Unit 10
HW 10-7

1) Place the following function into vertex form: $f(x) = x^2 - 24x + 146$

$f(x) = x^2 - 24x + 144 + 146$

$\frac{-24}{2} = (-12)^2 = +144$

$f(x) = (x-12)^2$

2) Place the following two functions into vertex mode and describe the transformation f(x) would have to go through to become g(x).
$f(x) = x^2 + 4x + 14$ and $g(x) = x^2 - 12x + 40$

$f(x) = x^2 + 4x + 4 + 14 + 4$ $\quad g(x) = x^2 - 12x + 36 + 40 - 36$

$\frac{+4}{2} = (+2)^2 = +4$ $\quad \frac{-12}{2} = (-6)^2 = +36$

$f(x) = (x+2)^2 + 18$ $\quad g(x) = (x-6)^2 + 4$

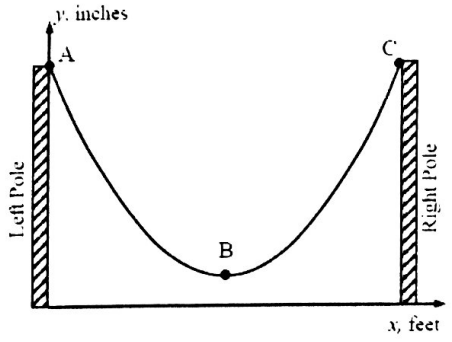
$+14$ up 14

-8 (right 8)

3)
A cable is attached at the same height from two poles and hangs between them such that its height above the ground, y, in inches, can be modeled using the equation:

$$y = x^2 - 16x + 67$$

where x represents the horizontal distance from the left pole, in feet.



(a) What height is point A above the ground? Show your work and use proper units.

67 ft

(b) Write the equation in vertex form.

x	y
0 (A)	67
1	52
2	39
3	28
4	19
5	12
6	7
7	4
8 (B)	3
9	4
...	...
16	67

(c) What is the difference in the heights of points A and B? Show your analysis and include units.

$y = x^2 - 16x + 64 + 67$

$\frac{-16}{2} = (-8)^2 = +64$

$y = (x-8)^2 + 3$

(d) What is the horizontal distance that separates points A and C? Explain your reasoning.

$67 - 4 = 63$ ft

pt C is (16, 67) because the poles are same height

$16 - 0 = 16$

4) Compare the vertex for both equations: $y = 2(x-2)^2 - 36$ and $y = 2x^2 - 8x - 28$.

$(2, -36)$ $(2, -36)$

Same vertex, same graph

5) Place the following function into vertex form: $f(x) = 2x^2 + 12x + 5$

$\frac{2}{2} \quad \frac{12}{2} \quad \frac{5}{2}$

$f(x) = 2(x^2 + 6x + 9 + \frac{5}{2} - 9)$

$+\frac{6}{2} = (+3)^2 = +9$

$f(x) = 2((x-3)^2 - 6.5)$

$f(x) = 2(x-3)^2 - 13$

6) Place the following function into vertex form and describe the shifts that $f(x) = x^2$ would have to go through to become g(x): $g(x) = 2x^2 + 28x - 686$

$\frac{2}{2} \quad \frac{28}{2} \quad \frac{686}{2}$

$g(x) = 2(x^2 + 14x + 49 - 343 - 49)$

$+\frac{14}{2} = (+7)^2 = +49$

$= 2((x+7)^2 - 392)$

$g(x) = 2(x+7)^2 - 784$

down 784
left 7
vert stretch ~~of~~ factor of 2

7) Solve: $-19x^2 + 14 - 23x = 19 - 25x^2 - 32x$

$+25x^2 \quad -19 \quad +32x \quad -19 \quad +25x^2 \quad +32x$

$\frac{6x^2}{6} + \frac{9x}{6} - \frac{5}{6} = 0$

$+\frac{5}{6} \quad +\frac{5}{6}$

$x^2 + \frac{3}{2}x + \frac{9}{16} = \frac{5}{6} + \frac{9}{16}$

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

$\sqrt{(x+\frac{3}{4})^2} = \sqrt{\frac{67}{48}}$

$x + \frac{3}{4} = \pm\sqrt{\frac{67}{48}}$

$-\frac{3}{4} \quad -\frac{3}{4}$

$x = -\frac{3}{4} \pm \sqrt{\frac{67}{48}}$