Name _____ KEY _____ Date _____

Algebra – Unit 5 Review Guide

1. Factoring – Factor the following polynomials completely

a. $x^2 + 6x + 5$

$$(x+5)(x+1)$$

b. $x^4 - 6x^2 - 27$

$$(x^2-9)(x^2+3)$$
$$(x+3)(x-3)(x^2+3)$$

c. $x^2 - 8x + 12$

$$(x-6)(x-2)$$

d. $-x^2 + 3x + 10$

$$-(x^2-3x-10)$$
$$-(x-5)(x+2)$$

e. $5x^2 + 19x - 4$

$$(5x - 1)(x+4)$$

f. $x^4 - 10x^2 + 9$

$$(x^2-9)(x^2-1)$$
$$(x+3)(x-3)(x+1)(x-1)$$

g. $2x^2 + 13x + 6$

$$(2x +1)(x+6)$$

h. $3x^2 - 30x + 72$

$$3(x^2-10x+24)$$
$$3(x-6)(x-4)$$

i. $9x^2 - 144$

$$9(x^2-16)$$
$$9(x+4)(x-4)$$

j. $x^2 + 6x$

$$x(x+6)$$

2. **Finding zeros - Use factoring to find the zeros of the following polynomials.**

a. $x^2 - 5x - 14$

$$(x-7)(x+2)$$

$$
\begin{array}{c|c}
x-7=0 & x+2=0 \\
x=7 & x=-2
\end{array}
$$

b. $x^2 + 6x - 40$

$$(x+10)(x-4)$$

$$
\begin{array}{c|c}
x+10=0 & x-4=0 \\
x=-10 & x=4
\end{array}
$$

c. $2x^2 + 5x + 2$

$$(2x+1)(x+2)$$

$$
\begin{array}{c|c}
2x+1=0 & x+2=0 \\
\underline{-1\ -1} & x=-2 \\
2x=-1 & \\
x=-\frac{1}{2} &
\end{array}
$$

d. $4x^2 + 4x - 15$

$$(2x-3)(2x+5)$$

$$
\begin{array}{c|c}
2x-3=0 & 2x+5=0 \\
\underline{+3\ +3} & \underline{-5\ -5} \\
2x=3 & 2x=-5 \\
x=\frac{3}{2} & x=-\frac{5}{2}
\end{array}
$$

e. $5x^2 - 35x + 50$

$$5(x^2 - 7x + 10)$$

$$5(x-5)(x-2)$$

$$
\begin{array}{c|c}
x-5=0 & x-2=0 \\
x=5 & x=2
\end{array}
$$

3. **Rearranging equations to find the vertex – Use the process of completing the square to determine the vertex of the parabolas defined by the following functions:**

a. $y = (x^2 + 8x) - 19$

$$y = (x^2 + 8x + 16) - 19 - 16$$

$$y = (x+4)^2 - 35$$

$$(-4, -35)$$

b. $y = (x^2 + 14x) + 71$

$$y = (x^2 + 14x + 49) + 71 - 49$$

$$y = (x+7)^2 + 22$$

$$(-7, 22)$$

c. $y = (x^2 - 6x) - 14$

$$y = (x^2 - 6x + 9) - 14 - 9$$

$$y = (x-3)^2 - 23$$

$$(3, -23)$$

d. $y = (-x^2 + 12x) - 17$

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

$$y = -(x^2 - 12x + 36) - 17 + 36$$

$$y = -(x-6)^2 + 19$$

$$(6, 19)$$

e. $y = (2x^2 + 20x) - 7$

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

$$y = 2(x^2 + 10x + 25) - 7 - 50$$

$$y = 2(x+5)^2 - 57$$

$$(-5, -57)$$

f. $y = (x^2 + 9x) - 44$

$$y = (x^2 + 9x + 20.25) - 44 - 20.25$$

$$y = (x + 4.5)^2 - 64.25$$

$$(-4.5, -64.25)$$