Optional Algebra 2 Summer Packet

I. **Solve** for x:

1) $-4(3 - x) = 2(x + 6)$

2) $3x - 2(x + 1) = 0$

II. **Solve** the following **systems** of equations:

1) $5x + 4y = 6$
$-2x - 3y = -1$

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

III. **Factor** each of the following polynomials:

1) $x^2 - x - 72$

2) $a^2 + 20a + 64$

3) $10m^3n^2 - 15m^2n + 25m$

4) $x^2 + 12x + 36$

5) $x^2 - 64$

6) $2x^2y - 4xy - 30y$

IV. **Solve** the following quadratic equations:

1) $(2x + 1)(x + 3) = 0$

2) $p^2 + 6p = 0$

3) $r^2 + 10r + 9 = 0$

4) $x^2 = 16$

V. **Determine** each of the following:

1) Find a formula for the area of a rectangle with $l = 2x + 3$ and $w = x - 2$

2) Find a formula for the area of a square with $s = 2x + 5$

3) The area of a square with side $2x - 1$ is 49. Find x.

4) Find the diagonal of a rectangle with $l = 40$ and $w = 55$.

5) The length of each leg of an isosceles right triangle is 4 cm. What is the length of the hypotenuse?

VI. **Simplify** each of the following:

1) $(-3x^2 + 4x - 7) + (2x^2 - 7x + 8)$

2) $(39a^4 - 4a^3 + 2a^2 - a - 7) - (10a^4 + 3a^3 - 2a^2 - a + 8)$

3) $(3x + 7)(2x + 5)$

4) $-3xy^3(x - 2y)$

5) $(3x^2 + x - 1)(2x - 3)$

6) $(8a^3b^2)(2a^4b^5)$ 7) $(-3x^2y^3z)^3$ 8) $(15a^4b^2c)^0$

9) $\frac{3x^3y^2}{6x^2y^5}$ 10) $(x + 6)^2$

VII. Graph each of the following on graph paper or create your own grid.

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

VIII. Given the following **matrices**,

$$A = \begin{bmatrix} 6 & -3 \\ 2 & 1 \end{bmatrix} \qquad B = \begin{bmatrix} 5 & 6 \\ 2 & -1 \end{bmatrix} \qquad C = \begin{bmatrix} 0 & 5 \end{bmatrix}$$

determine

1) A + B 2) A – B 3) -2C

IX. Solve the following quadratic equations, using the quadratic formula:

$$x = \frac{-b \pm \sqrt{b^2 - 4ac}}{2a}$$

1) $2x^2 + 3x - 1 = 0$ 2) $3x^2 - 8x = -2$ 3) $3x^2 = 7 - 2x$

X. Answer each of the following concerning **linear** equations.

1) Determine the slope of the line containing the points (6, -2) and (-1, 5).

2) Determine an equation for a line with slope ½ and y-intercept at (0, -3).

3) Determine an equation for a line parallel to y = -3x +4, containing the point (2, 1).