Honors Algebra 1
9.6 Day 2 - Applications

Name: **Key**
Period:

Ball Toss: A ball is tossed into the air from a height of 8 feet with an initial velocity of 8 feet per second. Find the time t (in seconds) it takes for the object to reach the ground by solving the equation $-16t^2 + 8t + 8 = 0$.

$$-16t^2 + 8t + 8 = 0$$

$$-8(2t^2 - t - 1) = 0$$

$$-8(2t + 1)(t - 1) = 0$$

$$2t + 1 = 0 \qquad t - 1 = 0$$

$$\frac{-1 \ -1}{2t = -1}$$

$$\boxed{t = 1 \text{ sec}}$$

$$t = -\frac{1}{2} \text{ neg. time}$$

Note Board Design: You are designing a note board that is made of corkboard and dry erase board. The area of the cork board is 6 square feet.

a) Write an equation of the area of the corkboard in standard form. $\boxed{X^2 + X - 6 = 0}$

$$X(X+1) = 6 \Rightarrow X^2 + X = 6$$

b) Find the dimensions of the corkboard.
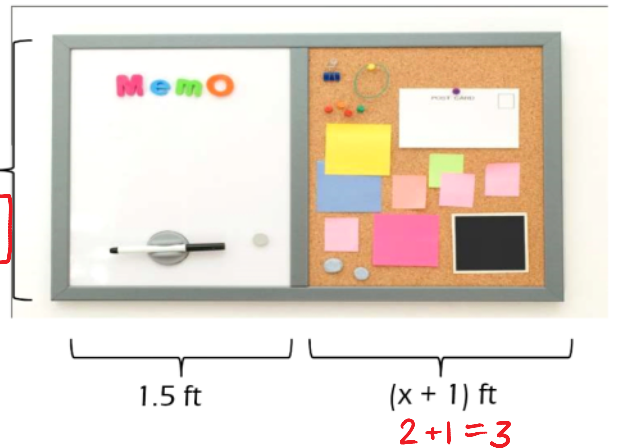
$$(X+3)(X+2) = 0$$

$$X+3 = 0 \qquad X+2 = 0$$

$$X = -3 \qquad X = 2$$

$\boxed{2 \times 3 \text{ ft}}$

c) Find the area of the dry erase board.

$$A = 2 \times 1.5$$

$$A = \boxed{3 \text{ ft}^2}$$

x ft

1.5 ft   (x + 1) ft

$$2 + 1 = 3$$

Hockey Schedule: In a hockey tournament, every team plays every other team exactly once. For n teams, the number of hockey games that must be scheduled is given by the expression $\frac{n^2 - n}{2}$. Ray's hockey league schedules 36 games. How many teams are there in Ray's league?

$$2 \cdot \frac{n^2 - n}{2} = 36 \cdot 2$$

$$n^2 - n = 72$$

$$n^2 - n - 72 = 0$$

$$(n-9)(n+8) = 0$$

$$n - 9 = 0 \qquad n + 8 = 0$$

$$n = 9 \qquad n = -8$$

$\boxed{9 \text{ games}}$

Area of a Rectangle: The length of a rectangle is 9 times the width. The area of the rectangle is 81 square meters. What are the dimensions of the rectangle?

$$9x = 27$$

$$x = 3 \qquad \boxed{27 \times 3 \text{ m}}$$

$$A = 9x(x)$$

$$81 = 9x^2$$

$$0 = 9(x-3)(x+3)$$

$$0 = x - 3 \qquad 0 = x + 3$$

$x = 3$ $\boxed{27 \times 3 \text{ m}}$

$81 = 9x^2$

$0 = 9x^2 - 81$

$0 = 9(x^2 - 9)$

$0 = x - 3$ $0 = x + 3$

$x = 3$ ~~$x = -3$~~

Factor:

1. $6x^2 - 36xy^2 + 12x^4y$

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

2. $21xy + 35y$

$7y(3x + 5)$

3. $56x^3 + 32x^2 - 16x$

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

4. $2x^2 - 17x + 21$

$(2x - 3)(x - 7)$

5. $3x^2 - 10x - 13$

$(3x - 13)(x + 1)$

6. $7x^2 - 33x + 20$

$(7x - 5)(x - 4)$

Solve for the variable:

1. $-x^3 + x^2 + 20x = 0$

$-x(x^2 - x - 20) = 0$

$-x(x - 5)(x + 4) = 0$

$-x = 0$ $x - 5 = 0$ $x + 4 = 0$

$\boxed{x = 0 \quad x = 5 \quad x = -4}$

2. $6x^2 - 28x = 10$

$6x^2 - 28x - 10 = 0$

$2(3x^2 - 14x - 5) = 0$

$2(3x + 1)(x - 5) = 0$

$3x + 1 = 0$ $x - 5 = 0$

$\quad -1 \; -1$

$\boxed{x = -\frac{1}{3} \quad x = 5}$

3. $-x^2 + 12x + 64 = 0$

$-1(x^2 - 12x - 64) = 0$

$-1(x - 16)(x + 4) = 0$

$x - 16 = 0$ $x + 4 = 0$

$\boxed{x = 16 \quad\quad x = -4}$

4. $3x^2 + 6x = 189$

$3x^2 + 6x - 189 = 0$

$3(x^2 + 2x - 63) = 0$

$3(x + 9)(x - 7) = 0$

$x + 9 = 0$ $x - 7 = 0$

$\boxed{x = -9 \quad x = 7}$

Going way back!

5. $3x^2 + 3 = x^2 - 3x + 2$

$\quad -x^2 \; -2 \; -x^2 + 3x - 2$

$2x^2 + 3x + 1 = 0$

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

$2x + 1 = 0$ $x + 1 = 0$

$\boxed{x = -\frac{1}{2} \quad\quad x = -1}$

6. $-12x^3 - 16x^2 = -20x^2 - 56x$

$\quad +20x^2 \; +20x^2 + 56x$

$-12x^3 + 4x^2 + 56x = 0$

$-4x(3x^2 - x - 14) = 0$

$-4x(3x - 7)(x + 2) = 0$

$-4x = 0$ $3x - 7 = 0$ $x + 2 = 0$

$\boxed{x = 0 \quad x = \frac{7}{3} \quad x = -2}$

Find the sum or difference (in standard form). Then name the polynomial by degree and # of terms.

1. $(3x^4 + 6x^2 + 2x) + (-x^2 + x^4)$

$4x^4 + 5x^2 + 2x$

2. $(x + 4) - (2x^2 - x + 4)$

$-2x^2 + 2x$

3. $x(x^2 - 4) + (5x^3 + 1)$

$x^3 - 4x + 5x^3 + 1$

$6x^3 - 4x + 1$

$$6x^3 - 4x + 1$$