Objective: Students will add, subtract, and multiply polynomials.

  I.   **Warm Up**

    A. Simplify each expression.

       1. $(-3x^3)(5x)$ 2. $9x - 18x$

       3. $10y^2 + 7y - 8y^2 - 1$ 4. $4(-5a + 6) - 2(a - 8)$

    B. Each side of a square is $(2x + 5)$ inches long. Write an expression for the perimeter of the square.

  II. **Add and Subtract Polynomials**

    A. To add or subtract polynomials, add or subtract the _____.

    B. Find the sum of $(2x^3 - 5x^2 + 3x - 9) + (x^3 + 6x^2 + 11)$

    C. Find the difference of $(3x^3 + 2x^2 - x + 7) - (8x^3 - x^2 - 5x + 1)$

    D. **You Try!** Simplify

       1. $(3y^3 - 2y^2 - 7y) + (-4y^2 + 2y - 5)$ 2. $(5z^2 - z + 3) - (4z^2 + 9z - 12)$

3. The sum of $-2x^2 + x + 31$ and $3x^2 + 7x - 8$ can be written in the form $ax^2 + bx + c$, where a, b, and c are constants. What is the value of a + b + c?

III. Multiplying Polynomials

A. To multiply two polynomials, multiply each term of the first polynomial by _____

_____.

B. Find the product $(y - 2)(- 2y^2 + 3y - 6)$

C. Find the product $(x - 5)(x + 1)(x + 3)$

D. **You Try!** Find the product.

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

IV. Special Product Patterns

A. Sum and Difference: $(a + b)(a - b) =$

EX. $(x + 4)(x - 4) =$

B. Square of a Binomial: $(a + b)^2 =$ $\qquad$ $(a - b)^2 =$

 EX. Use the formulas to expand the following:

  1. $(y + 3)^2$

  2. $(5z - 4)^2$

  3. $(3z^2 - 5)^2$

C. Cube of a Binomial: $(a + b)^3 =$

        $(a - b)^3 =$

 EX. Use the formulas to expand the following:

  1. $(x + 2)^3 =$

  2. $(p - 3)^3 =$

D. **You Try!** Use the special product patterns to find the products.

  1. $(3t + 4)(3t - 4) =$

  2. $(8x - 3)^2 =$

3. $(p+5)^3 =$

V. Applications

A. Since 1980, the number W (in thousands) of United States wells producing crude oil and the average daily oil output per well O (in barrels) can be modeled by

$$W = -0.575t^2 + 10.9t + 548 \text{ and } O = -0.249t + 15.4$$

where t is the number of years since 1980. Write a model for the average total amount T of crude oil produced per day. What was the average total amount of crude oil produced per day in 2000?

B. New highway markers are placed every $(6x - 6)$ feet along a stretch of highway. The total number of markers is represented by $x^2 - 3x + 1$. Write a model for the distance along the highway where the markers are placed. If the markers are placed every 528 feet, what length of highway received new markers?