By the end of the lesson, you will be able to:

- Define the terms Polynomial and Monomial, and determine the degree of a monomial & polynomial.
- Simplify Polynomials by combining like terms.
- Evaluate Polynomial functions.
- Add, Subtract and Multiply Monomials, Polynomials and special functions.

Multiplying Special Products: *Certain products end up following specific patterns every time. The following are special product formulas that make it easy to find a product quickly.*

DIFFERENCE OF TWO SQUARES:

M) $(A - B)(A + B) = A^2 - B^2$

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

SQUARES OF BINOMIALS , or PERFECT SQUARE BINOMIALS:

$(A+B)^2 = A^2 + 2AB + B^2$ and $(A-B)^2 = A^2 - 2AB + B^2$

N) $(n+8)^2$

O) $(7z-2)^2$

POLYNOMIAL FUNCTIONS: A function whose rule is a polynomial. (Example: $f(x) = 3x^2 - 2x^2 + 6x + 1$)

ADDING, SUBTRACTING, &MULTIPLYING POLYNOMIAL FUNCTIONS:

If f and g are functions, then

$$(f + g)(x) = f(x) + g(x)$$

$$(f - g)(x) = f(x) - g(x)$$

$$(f \cdot g)(x) = f(x) \cdot g(x)$$

EXAMPLES: Let $f(x) = 2x^2 + x - 3$ and $g(x) = -x^2 - 2x + 1$

P) $(f + g)(x) =$

Q) $(f - g)(x) =$

* R) $(f + g)(2) =$

*Note: When evaluating functions at a specific value of x, evaluate ***each*** function at that point FIRST, then combine.

S) Let $f(x) = 3x^2$ and $g(x) = x^2 - 2x + 1$

Find: $(f \cdot g)(x)$

APPLICATIONS: The Profit Function.

Profit is defined as total revenue minus total cost. The profit function of a company is shown as $P(x) = R(x) - C(x)$

Example: If a company sells sunglasses for \$20, the revenue function is $R(x) = 20x$. If the company's variable cost is \$8 per pair of sunglasses and fixed costs are \$1000 per week, the cost function is $C(x) = 8x + 1000$

a) Find the profit function $P(x)$

b) Determine and interpret $P(750)$

Rational Exponents

Fraction exponents, called **rational exponents**, are another way to represent roots. For rational exponents, the *numerator* represents the power, and the *denominator* represents the root.

$$a^{\frac{1}{m}} = \sqrt[m]{a}$$

$$5^{\frac{1}{3}} = \sqrt[3]{5}$$

$$a^{\frac{n}{m}} = \sqrt[m]{a^n} = \left(\sqrt[m]{a}\right)^n$$

$$5^{\frac{2}{3}} = \sqrt[3]{5^2} = \left(\sqrt[3]{5}\right)^2$$

Exponent Monster

Examples:

a.) $36^{\frac{1}{2}} =$

b.) $64^{\frac{1}{3}} =$

c.) $36^{\frac{3}{2}} =$

d.) $27^{\frac{4}{3}} =$

Examples:

e.) $9^{\frac{3}{2}} =$

f.) $27^{\frac{2}{3}} =$

g.) $49^{-\frac{1}{2}} =$

h.) $\left(\frac{1}{8}\right)^{-\frac{1}{3}} =$

Homework:

Pg. 374: 15, 21, 29, 31, 35, 43, 47, 51, 53, 57, 61, 65, 71, 75, 87, 101, 105