Polynomial Functions

What is a polynomial?

A **polynomial** is the sum or difference of two or more **monomials**.

Examples of polynomials

x+2, $3y^2$+y-1, and 4ab - 3b

a) $P(x) = 2x + 4x^2 - 5$

term:
constant:
coefficient:
degree:
standard form:

b) $P(x) = -8 - 2x^2y + x^3y^2 - 2x^2y + 5xy$

term:
constant:
coefficient:
degree:
standard form:

Polynomials can be identified in two ways: 1) by degree and 2) by term number.

Degree	Name by degree	Example
0		
1		
2		
3		
4		

Term Number	Name by Term #	Example
1		
2		
3		
4		
5		

1. $\frac{3}{4}x^3 - 2x^2 + 6x - 7$ _____

2. $4x^4 - 8$ _____

Adding Polynomials

To add polynomials we simply add any **like terms**.

1. Add $2x^2 + 6x + 5$ and $3x^2 - 2x - 1$

Subtracting Polynomials

To subtract Polynomials, first **reverse the sign of each term** we are subtracting (in other words turn "+" into "-", and "-" into "+"), **then add** as usual.

2. Add $3x^3 + 2x^2 - x - 7$ and $x^3 - 10x^2 + 8$

3. Subtract $8x^3 - 3x^2 - 2x + 9$ and $2x^3 + 6x^2 - x + 1$

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

Multiplying Polynomials

To multiply two polynomials:

- multiply **each term** in one polynomial by **each term** in the other polynomial (use the distributive property)
- add those answers together, and simplify if needed

Multiply the following:

1. $2x^2 * 4x^3$
2. $3x^2(4x - 5)$
3. $(2x^2 + 3)(5x)$
4. $(x + 2)(x - 5)$
5. $(x - 3)(-x^2 + 2x + 4)$
6. $(x + 3)(x - 5)(x - 6)$

Polynomial Squaring and Cubing and BEYOND

WARNING!

Don't fall for this TRAP! It's not as easy as you think!

You must write out each of the polynomials and then multiply.

$(a + b)^2$ **$(a + b)^3$**

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

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