Expanding and Simplifying:

- Collecting Like Terms

Probably the most common thing you will be doing with polynomials is "combining like terms". This is the process of adding together whatever terms you can, but not overdoing it by adding together terms that can't actually be combined.

Terms can be combined if they have the exact same variable part. Here is a rundown of what's what:

LIKE TERM - exact same variable(s)

Examples:

1) $3x + 4x$

$= 7x$

2) $2x^2 + 3x - 4 - x^2 + x + 9$

$x^2 + 4x + 5$

3) $10x^3 - 14x^2 + 3x - 4x^3 + 4x - 6$

$6x^3 - 14x^2 + 7x - 6$

4) $-4y - [3x + (3y - 2x + \{2y - 7\}) - 4x + 5]$

$-4y - [3x + (3y - 2x + 2y - 7) - 4x + 5]$

$-4y - 1(3x + 3y - 2x + 2y - 7 - 4x + 5)$

$-4y - 3x - 3y + 2x - 2y + 7 + 4x - 5$

$= 3x - 9y + 2$

$3a^2b + 4ab^2 - 2ab^2$

$3a^2b + 2ab^2$

ex.

$3a^2b(2ab^2 - 3a^2b)$

$= 6a^3b^3 - 9a^4b^2$

• Distributive Property

The Distributive Property is easy to remember, if you recall that "multiplication *distributes* over addition and subtraction".

Formally, this property is displayed as...

$$\boxed{a(b+c) = ab + ac}$$

Examples:

1) $3(2x-5)$

$6x-15$

2) $3a(2a+4)$

$6a^2+12a$

3) $7x^2y\left(3x^2y+4xy-2y\right)$

$=21x^4y^2+28x^3y^2-14x^2y^2$

Multiplying Polynomials...

1) $(x-3)(x+7)$

$= x^2+7x-3x-21$

$= x^2+4x-21$

2) $(2x+1)(7x-6)$

$=14x^2-12x+7x-6$

$=14x^2-5x-6$

3) $(3a-4b)(2a-b)$

$=6a^2-3ab-8ab+4b^2$

$=6a^2-11ab+4b^2$

4) $(5x-3)(5x+3)$

$=25x^2+15x-15x-9$

$=25x^2-9$

5) $2(4x-3)(2x+3)$

$2(8x^2+12x-6x-9)$

$2(8x^2+6x-9)$

$=16x^2+12x-18$

6) $(3y-2)(4y^2+5y-3)$

$=12y^3+15y^2-9y-8y^2-10y+6$

$=12y^3+7y^2-19y+6$

$(3x-5)^2$

$(3x-5)(3x-5)$

$= 9x^2 - 15x - 15x + 25$

$= 9x^2 - 30x + 25$

$(4x+3)^2$ 3 step Rule $=$ (Square 1st) + (1st x 2nd Doubled) + (Square Last)

$(4x+3)(4x+3)$

$16x^2 + 12x + 12x + 9$

$= 16x^2 + 24x + 9$

Squaring a Binomial

- To **expand** a product of polynomials means to remove brackets by multiplying and then simplify by adding/subtracting "Like" terms.

- We must use the Distributive Property to multiply polnomials.

What is the 3-Step rule???

Ex: $(2x - 7)^2$

- is used when you want to square a binomial.
- here is how it goes...
  (1) Square the first
  (2) Product of the first and last, then double
  (3) Square the last

$= 4x^2 - 28x + 49$

Another example??? Example - Squaring a Binomial.avi

Let's do some examples...

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

$9x^2 - 30x + 25$

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

$(x-3)(x-3)$

$2(x^2 - 6x + 9) - 3(x^2 + 3x - x - 3)$

$2x^2 - 12x + 18 - 3x^2 - 9x + 3x + 9$

$-x^2 - 18x + 27$

HOMEWORK...

Worksheet - Expanding.pdf

Pick any 3 from each question

Attachments

Example - Squaring a Binomial.avi

Worksheet - Expanding.pdf