Multiplying and dividing Polynomials

Product of monomial and polynomial

Ex 1:

$3(x + 4)$

$= 3x + 12$

Ex 2:

$3x(x + 4)$

$= 3x^2 + 12x$

Remember the invisible exponent of 1 on the x. Add the exponents!

- Ex 3:

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

$= -6x^5 + 4x^3$

Keys:

- Think of rainbows!
- Multiply the numbers first (watch signs)
- Multiply the variables (keep base, add exponents)

Dividing a polynomial by a monomial

Ex 4:

$$\frac{18x^3}{6} = 3x^3$$

Ex 5:

$$\frac{18x^3}{6x} = 3x^2$$

You've done this before when we learned about Quotient Rules for exponents!

Ex 6:

$$\frac{36x^{10}y^{7}}{9x^{7}y^{3}} = 4x^{3}y^{4}$$

Hints: Chop into 3 sections! Coefficients first, then x stuff, then y stuff

Ex 7:

$$\frac{16x^4 - 12x^2 + 4x}{4x}$$

$$= \frac{16x^4}{4x} - \frac{12x^2}{4x} + \frac{4x}{4x}$$

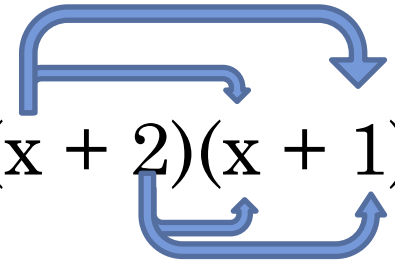
$$= 4x^3 - 3x + 1$$

Hint: treat this like three division problems! Break it down into steps.

FOIL – Multiplying binomials

Multiplying Binomials

Example 1



$(x + 2)(x + 1)$

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

$= x^2 + x + 2x + 2$

$= x^2 + 3x + 2$

FOIL

F: First
O: Outside
I: Inside
L: Last

Multiplying Binomials

Example 2

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

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

$= 2x^3 + 6x + -3x^2 + -9$

$= 2x^3 - 3x^2 + 6x - 9$

FOIL

F: First
O: Outside
I: Inside
L: Last

Multiplying binomials

- Example 3

$(x - 1)^2$

$= (x - 1)(x - 1)$

$= x^2 - x - x + 1$

$= x^2 - 2x + 1$

FOIL

F: First

O: Outside

I: Inside

L: Last

Finding the Greatest Common Factor

GCF = the largest number and power that each term can be divided by in an expression

Ex: $2x^3y^3 + 4x^2y^5$

Questions to consider:

- What is the largest number that we can divide both terms by?
- What is the largest power that all terms can be divided by for each base?

GCF = $2x^2y^3$

Find the greatest common factor

Ex 2:

$$25m^9n^7 + 15m^3n^5 - 10m\,n^8$$

$$\text{GCF} = 5m\,n^5$$