

Recall:

$\frac{x}{x} = 1$

$x \cdot x = x^2$

$x + x = 2x$

$x + y$ or $x^2 + x$

Foundations and Pre-Calculus 10

are not like terms and cannot be combined

$(+)(+) = +$
 $(-)(-) = +$
 $(+)(-) = -$
 $(-)(+) = -$

same applies for division.

2.3 - Common Factors of a Polynomial

Review: *Distributive property*

1. Simplify the expression:

a) $\frac{6x^2}{2x} = \frac{3 \cdot 2 \cdot x \cdot x}{2 \cdot x} = 3x$

b) $\frac{4x^2 - 12x}{4x} = \frac{4x^2}{4x} - \frac{12x}{4x} = x - 3$

2. Write the GCF:

a) 9, 6
GCF = 3

b) 16, 12
GCF = 4

c) 12, 24
GCF = 12

d) xy, xz
GCF = x

e) $6ab, 15ac$
GCF = $3a$

f) $-6a^3b^3, -15a^2b$
GCF = $-3a^2b$

FACTORING THE GCF: *Distributive Property: $2(x+1) = 2x+2$*

Factor means Re-write expression as product of its factors.

What to ask yourself to find the GCF:

1. What is the largest factor that goes into **ALL** the coefficients?
2. What variable appears in **ALL THE TERMS** and is the lowest exponent of each of these letters?

GCF of
① numerical
② variable.

Examples:

1) $6x^2 - 15x^3$ GCF = $3x^2$

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

GCF terms left over after GCF is divided out

Steps:

1. Find the GCF of the coefficients.
2. Determine the variable common to all terms. Remove the lowest exponent value of this variable.
3. Divide all terms in the expression by the GCF determined from steps #1 & #2.
4. Write your answer as multiplication with the GCF at the front of the brackets.

check by expanding:

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

$= 6x^2 - 15x^3$ ✓ matches original expression

Foundations and Pre-Calculus 10

$$2) \frac{24x^2y^3}{8x^2x} - \frac{16x^3y}{8x^2x}$$

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

$$\text{GCF} = 8x^2y$$

$$\text{check: } 8x^2y(3y^2 - 2x)$$

$$= 24x^2y^3 - 16x^3y \checkmark$$

$$3) \frac{4x^2}{2} - \frac{6x}{2} + \frac{12}{2}$$

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

$$\text{GCF} = 2$$

$$\text{check: } 2(2x^2 - 3x + 6)$$

$$= 4x^2 - 6x + 12 \checkmark$$

** the leading coefficient determines the sign of the GCF! **

$$4) \frac{-3x^3}{-3x} - \frac{9x^2}{-3x} + \frac{12x}{-3x}$$

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

$$\text{GCF} = -3x$$

$$\text{check: } -3x(x^2 + 3x - 4)$$

$$= -3x^3 - 9x^2 + 12x \checkmark$$