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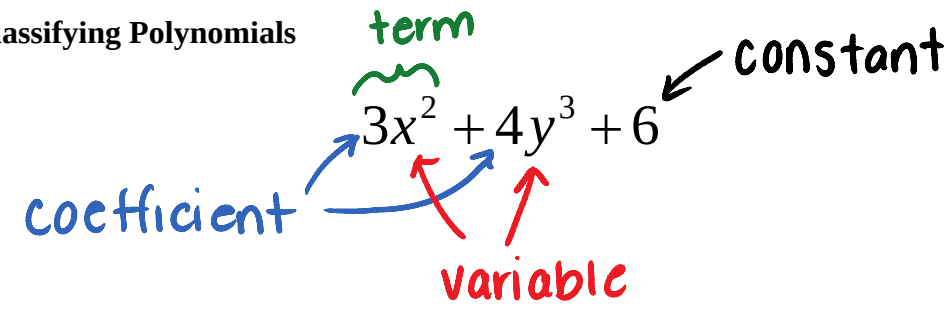
Lesson 2: Common Factors of a Polynomial

A. Classifying Polynomials



Polynomials consist of one or more terms – separated by + and - signs

Types of polynomials:

degree 5 → 2+3

Monomial: 1 term $4x$, $2x^2y^3$, $-6ab^2c$

Binomial: 2 terms $x+4$, $-2ab+c$

Trinomial: 3 terms x^2+x+4

Polynomial: 4 or more terms

$2x^2y^1 + 3x^3y^2$ degree 5

Examples: *Classify each polynomial and state the degree:*

1) $3x^2 + 4x - 1$ trinomial (quadratic) degree 2

2) $9x^2 - x + 7x^3 - 1$ polynomial degree 3

B. Factoring Polynomials

To factor a polynomial, we write the polynomial as a *product* of its factors.

To do this we must determine the greatest common factor or GCF.

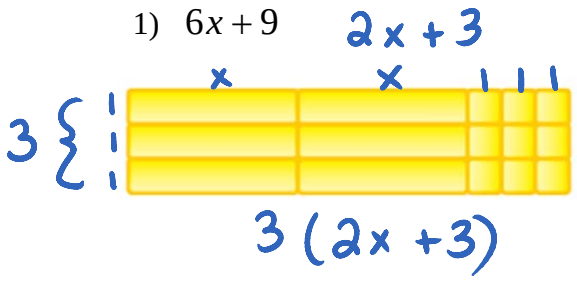
Example 1: *State the GCF.*

1) $12ab, 15a^2b^2$ $3ab$

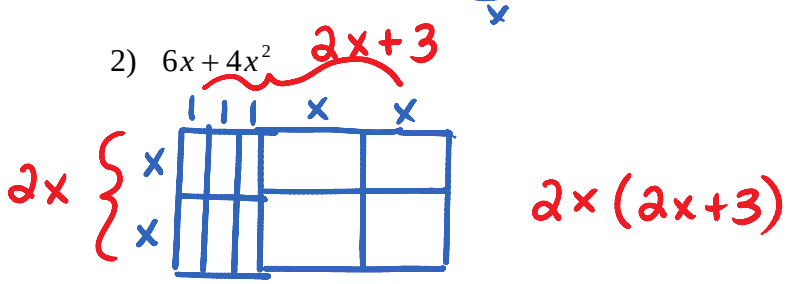
2) $18x^4y^2, -24x^3y^5$ $6x^3y^2$

Example 2: *Factor using algebra tiles.*

1) $6x+9$



2) $6x+4x^2$



Example 3: *Factor. Check by expanding.*

1) $5ab^2-15ab+20a^2$ (multiply)

GCF = 5a

$\frac{5ab^2}{5a} \quad \frac{-15ab}{5a} \quad \frac{20a^2}{5a}$

$= 5a(b^2-3b+4a) = 5ab^2-15ab+20a^2$

2) $-5x^2-10x+5$

GCF = -5

$\frac{-5x^2}{-5} \quad \frac{-10x}{-5} \quad \frac{5}{-5}$

$= -5(x^2+2x-1) = -5x^2-10x+5$

3) $-12x^3y-20xy^2-16x^2y^2$

GCF = -4xy

$\frac{-12x^3y}{-4xy} \quad \frac{-20xy^2}{-4xy} \quad \frac{-16x^2y^2}{-4xy}$

$= -4xy(3x^2+5y+4xy)$

Example 4: The surface area of a cylinder is given by the formula: $SA = 2\pi r^2 + 2\pi rh$

i) Write the formula in factored form.

GCF = $2\pi r$

$SA = \frac{2\pi r^2}{2\pi r} + \frac{2\pi rh}{2\pi r}$

$SA = 2\pi r(r+h)$

ii) Use both formulas to calculate the surface area of a cylinder with a radius of 6 cm and a height of 11 cm.

$SA = 2\pi r^2 + 2\pi rh$

$= 2\pi(6)^2 + 2\pi(6)(11)$

$= 226.19 + 414.69$

$= 640.9\ cm^2$

$SA = 2\pi r(r+h)$

$= 2\pi(6)(6+11)$

$= 2\pi(6)(17)$

$= 640.9\ cm^2$

iii) Which formula is simpler to use?

$SA = 2\pi r(r+h)$

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