Unit 2 Review

Friday, June 2, 2023   1:33 PM
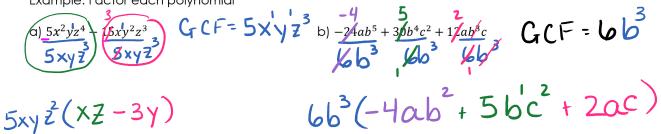
A. Factoring

1) Greatest Common Factor (GCF)

- Look at each term in the polynomial and identify what they have in common.
  - Each coefficient must be divisible by the same factor.
  - Each common variable must have the same minimum exponent.

Example: Factor each polynomial

a) $5x^2yz^4 - 15xy^2z^3$ $GCF = 5x^1y^1z^3$ b) $-24ab^5 + 30b^4c^2 + 12ab^3c$ $GCF = 6b^3$

$\dfrac{5xyz^3}{} \quad \dfrac{3xyz^3}{}$

$5xyz^2(xz - 3y)$

$6b^3(-4ab^2 + 5b^1c^2 + 2ac)$

2) Factoring Trinomials $ax^2 + bx + c$

$\_\_ \times \_\_ = ac$
$\_\_ + \_\_ = b$

- Find two numbers that have a product of "ac" and have a sum of "b"
- Separate the middle term using your two numbers
- Factor out a GCF for the first two terms and a different GCF for the last two terms
- Matching bracket is the first factor and the two GCF's make the second factor

Example: Factor the trinomials

a) $x^2 - 5x - 6$ $\_\_ \times \_\_ = -6$ b) $6x^2 + 17x + 5$ $\_\_ \times \_\_ = 30$
           $\_\_ + \_\_ = -5$ $\_\_ + \_\_ = 17$

$x^2 + 1x - 6x - 6$ -1×6 $6x^2 + 2x + 15x + 5$ 1×30
                          -2×3 2×15
$x(x+1) - 6(x+1)$ 1×-6 $2x(3x+1) + 5(3x+1)$ 3×10
                          2×-3 5×6
$(x+1)(x-6)$ $(3x+1)(2x+5)$

$4 \qquad \sqrt{4} = 2$
$25 \qquad \sqrt{25} = 5$

3) Factoring Perfect Square Trinomials $ax^2 + bx + c$

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$$\sqrt{4} = 2$$
$$25 \quad \sqrt{25} = 5$$
$$x^2 \quad \sqrt{x^2} = x$$

Perfect square trinomials meet the following conditions:
- The first term (ax^2) and the last term (c) are perfect squares
- The middle term (bx) is double the product of the square root of the first term and the last term.

$$bx = 2(\sqrt{ax^2})(\sqrt{c})$$

Example: Factor the trinomials.

a) $9x^2 + 12x + 4$

$$9x^2 = (3x)^2 \qquad (3x + 2)^2$$
$$4 = (2)^2$$
$$12x = 2(3x)(2) \checkmark$$

b) $4x^2 - 20x + 25$

$$4x^2 = (2x)^2 \qquad (2x - 5)^2$$
$$25 = (5)^2$$
$$20x = 2(2x)(5) \checkmark$$

4) Factoring Difference of Square Polynomials $a^2 - b^2$

Difference of square polynomials meet the following conditions:
- They only have two terms (binomial)
- Each term is a perfect square
- The terms are subtracted

Example: Factor the binomials

a) $x^2 - 144$

$$x^2 = (x)^2 \qquad (x + 12)(x - 12)$$
$$144 = (12)^2$$

b) $4x^2 - 49$

$$4x^2 = (2x)^2 \qquad (2x + 7)(2x - 7)$$
$$49 = (7)^2$$

B. Multiplying Polynomials

Use the **DISTRIBUTIVE LAW** for multiplying polynomials:

- Multiply each term from the first polynomial by each term from the second polynomial.
- Combine like terms

Example: Expand and simplify

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

$$= x(x) + x(4) - 3(x) - 3(4)$$
$$= x^2 + 4x - 3x - 12$$
$$= x^2 + 1x - 12$$
$$\text{or}$$
$$x^2 + x - 12$$

b) $x - 2(x^2 - 9x - 3)$

$$= x - 2(x^2) - 2(-9x) - 2(-3)$$
$$= x - 2x^2 + 18x + 6$$
$$= -2x^2 + 19x + 6$$

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