Factoring by Grouping and Sum/Difference of Cubes

Factoring by Grouping

Step 1: Group the first two terms together and then the last two terms together.

Step 2: Factor out a GCF from each separate binomial.

Step 3: Factor out the common binomial.

These notes go on the front flap of the trifold - "Factoring Flowchart."

$$6v^3 - 16v^2 + 21v - 56$$

$$2v^2(3v-8) + 7(3v-8)$$

$$(3v-8)(2v^2+7) \quad \checkmark$$

Check: $6v^3 + 21v - 16v^2 - 56$

$$12x^3 + 2x^2 - 30x - 5$$

$$2x^2(6x+1) - 5(6x+1)$$

$$(6x+1)(2x^2-5)$$

Check: $12x^3 - 30x + 2x^2 - 5$

These notes go on the inside flap of the trifold - "Factoring Flowchart."

Sum of Two Cubes

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

Difference of Two Cubes

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

What are the perfect squares? 1, 4, 9, 16, 25, 36...

What are the perfect cubes? 1, 8, 27, 64, 125, 216...

Example: $8x^3 + 27 = (2x)^3 + (3)^3$

$= (2x+3)(4x^2-6x+9)$

Example: $64x^3 - 1 = (4x)^3 - (1)^3$

$= (4x-1)(16x^2+4x+1)$

Examples from worksheet - Factoring by Grouping

① $2b^3+2b^2+3b+3$

$2b^2(b+1)+3(b+1)$

$(b+1)(2b^2+3)$

$2b^3+3b+2b^2+3$

② $12r^3-18r^2+2r-3$

$6r^2(2r-3)+1(2r-3)$

$(2r-3)(6r^2+1)$

$12r^3+2r-18r^2-3$

Examples from worksheet - Sum/Difference of Cubes

① $125x^3 - 216$

$(5x)^3 - (6)^3 = (5x-6)(25x^2+30x+36)$

② $64x^3 + 125$

$(4x)^3 + (5)^3 = (4x+5)(16x^2-20x+25)$

③ $125 - 64x^3$

$(5)^3 - (4x)^3 = (5-4x)(25+20x+16x^2)$