5.4 Factoring Higher Order Polynomials

1. **Factoring Difference of Squares** $a^2 - b^2 = (a + b)(a - b)$

$x^2 - 64$ $25x^2 - 16$

$x^8 - 1$ $x^4 - y^4$

2. **Factoring Trinomials**

$x^2 - 10x + 9$ $x^4 - 10x^2 + 9$

$x^2 - 29x + 100$ $x^4 - 29x^2 + 100$

$16x^2 - 80x + 100$ $9x^2 + 6x + 1$

$6x^4 - 15x^3 + 6x^2$

3. Factoring by Grouping, continue to check for GCF.

$10x^2 - 15x + 8x - 12$

Grouping

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

Grouping

$20x^4 + 12x^3 + 10x^2 + 6x$

Grouping

$x^4 - 4x^3 - x^2 + 4x$

Grouping

4. Factoring the sum and difference of cubes.

*There is a formula, see page 451 in your book to see why these formulas work. This formula is on your formula chart.

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

Remember your signs with SOAP: Same Opposite Always Positive

$8x^3 - 125$ $\qquad\qquad\qquad\qquad\qquad\qquad\qquad$ $x^3 + 27$

$27x^3 - 64$ $\qquad\qquad\qquad\qquad\qquad\qquad\qquad$ $125x^3 + 1$

Practice Problems: Factor completely!

1. $x^3 + 64$ $\qquad\qquad\qquad\qquad\qquad\qquad$ 2. $25x^2 - 30x - 7$

3. $27x^3 - 64$ $\qquad\qquad\qquad\qquad\qquad\qquad$ 4. $24x^4 - 8x^3 + 21x^2 - 7x$