

## Factoring Summary

1. **Always** look for a common factor first.

2. If there are **2 terms**, look for:

- |                           |                                       |
|---------------------------|---------------------------------------|
| a. Difference of squares  | $a^2 - b^2 = (a + b)(a - b)$          |
| b. Sum of squares (prime) | $a^2 + b^2$                           |
| c. Difference of cubes    | $a^3 - b^3 = (a - b)(a^2 + ab + b^2)$ |
| d. Sum of cubes           | $a^3 + b^3 = (a + b)(a^2 - ab + b^2)$ |

(Use SOAP to remember the signs when you factor cubes.)

3. If there are **3 terms**:

- Guess and check method
- AC Method (see handout)

4. If there are **4 terms** use grouping.

Example:  $3x^2 + 6x + 5x + 10$

Ask yourself, what could you factor out of the first two terms?

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

And what could you factor out of the second two terms?

$$5x + 10 = 5(x + 2)$$

So,  $3x^2 + 6x + 5x + 10 = 3x(x + 2) + 5(x + 2)$

Note: the stuff in the parentheses must match!

Now you have 2 big, complicated terms:

$$3x(x + 2) + 5(x + 2)$$

They have  $(x+2)$  in common, which we will factor out. The answer is

$$(x + 2) (3x + 5)$$