

# Factoring by Grouping Notes

## Factoring by Grouping:

### Steps in Factoring by Grouping:

Step 1: rewrite four terms so that the first two terms have a common factor and the last two terms have common factor.

Step 2: Group the first two terms and the last two terms.

Step 3: Both the first two terms and last two terms have a common factor. Use the distributive property to factor each group of two terms.

Step 4: Finally, you can factor the common binomial factor.

### Sample problem 1: Factor the following Polynomial by grouping.

$$\begin{aligned}1. & 3y + 6 + by + 2b \\&= 3y + by + 6 + 2b \\&= (3y + by) + (6 + 2b) \\&= y(3 + b) + 2(3 + b) \\&= (y + 2)(3 + b)\end{aligned}$$

$$\begin{aligned}2. & x^2 + 5x + 2x + 10 \\&= x^2 + 2x + 5x + 10 \\&= (x^2 + 2x) + (5x + 10) \\&= x(x + 2) + 5(x + 2) \\&= (x + 5)(x + 2)\end{aligned}$$

$$\begin{aligned}3. & ax + ay - bx - by \\&= (ax + ay) + (-bx - by) \\&= a(x + y) - b(x + y) \\&= (a - b)(x + y)\end{aligned}$$

$$\begin{aligned}4. & xy + 2x + y + 2 \\&= (xy + 2x) + (y + 2) \\&= x(y + 2) + (y + 2) \\&= (x + 1)(y + 2)\end{aligned}$$