

# Factor by Grouping

A Technique used to try Factoring a 4-term Polynomial.

Use this when there isn't a GCF for the entire polynomial. \* Try to break the 4-terms into two groups, each having its own GCF. \*

①  $(x^2 + 2x) + (xy + 2y)$

Factor  $\rightarrow x(x + 2) + y(x + 2)$

Distribute  $\rightarrow (x + 2)(x + y)$  Since the  $(x + 2)$  multiplies to both the  $x$  and  $y$ .

②  $(n^2 + 2n) + (3mn + 6m)$

Factor  $\rightarrow n(n + 2) + 3m(n + 2)$  So...

$(n + 2)$  distributes to both  $n$  and  $3$ , thus...  
 $(n + 2)(n + 3m)$

$$\text{Ex 2 } (x^2 - 3x) + (4x - 12)$$

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

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

Like  
#3

Ex 3

$$(8r^3 - 64r^2) + (r - 8)$$

$$8r^2(r - 8) + 1(r - 8)$$

$$(r - 8)(8r^2 + 1)$$

Ex 4

$$(2x^2 + 3xy)(-8xy - 12y^2)$$

$$x(2x + 3y) - 4y(2x + 3y)$$

$$(2x + 3y)(x - 4y)$$

Ex 5

$$15mx - 4ny - 6my + 10nx$$

$$15mx + 10nx - 4ny - 6my$$

$$5x(3m + 2n) - 2y(2n + 3m)$$

$$(3m + 2n)(5x - 2y)$$