

Factoring by Grouping

Certain polynomials, though they have no common factors, can be still be factored by using common factors. We have to be able to re-group the terms so that they are in groups that have common terms.

Look at $3xm + 3ym - 2x - 2y$

2 terms have x and 2 terms have y

$$(3xm - 2x) + (3ym - 2y)$$

Factor x out of the first part and y out of the last part

$$x(3m - 2) + y(3m - 2) \quad \text{note: } 3m - 2 \text{ is now in common}$$

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

Example:

Factor $3a + 3b - ma - mb$

$$(3a + 3b) + (-ma - mb)$$

Factor 3 out of first part and $-m$ out of second part

$$3(a + b) - m(a + b) \quad \text{note: factoring } -m \text{ out of } -mb \text{ leaves } +b$$

$$(3 - m)(a + b)$$