

Factoring Polynomials by Grouping

(4 Terms)

Key

Steps	Example
Step 1: Group the first two terms together and the last two terms together.	$x^3 + 7x^2 + 2x + 14$
Step 2: Factor out the GCF for each binomial.	$x^2(x+7) + 2(x+7)$
Step 3: The GCF from each binomial will become one factor and remaining binomial will be the other factor.	$(x^2+2)(x+7)$
Step 4: Use FOIL to check your answer.	

Practice!

Factor each polynomial by grouping. Check your answer by FOIL.

1. $3x^3 + 15x^2 - 2x - 10$

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

2. $8x^2 + 12x + 2xy + 3y$

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

3. $x^3 + 2x^2 - 5x - 10$

$$x^2(x+2) - 5(x+2)$$
$$(x+2)(x^2-5)$$

4. $x^4 + 4x^3 + 2x + 8$

$$x^3(x+4) + 2(x+4)$$
$$(x+4)(x^3+2)$$

5. $6y^2 - 3y + 2yz - z$

$$3y(2y-1) + z(2y-1)$$
$$(2y-1)(3y+z)$$

6. $x^2y + 3x^2 - 7y^2 - 21y$

$$x^2(y+3) - 7y(y+3)$$
$$(y+3)(x^2-7y)$$

7. $10x^3 - 25x^2 + 4x - 10$

$$5x^2(2x-5) + 2(2x-5)$$
$$(2x-5)(5x^2+2)$$

8. $2x^2y + 6xy - x - 3$

$$2xy(x+3) - 1(x+3)$$
$$(x+3)(2xy-1)$$

9. $6mn - 9m - 4n + 6$

$$3m(2n-3) - 2(2n-3)$$
$$(2n-3)(3m-2)$$

10. $a^3 + a^2b + ab + b^2$

$$a^2(a+b) + b(a+b)$$
$$(a+b)(a^2+b)$$

11. $4r^2s - 8rs - 3r + 6$

$$4rs(r-2) - 3(r-2)$$
$$(r-2)(4rs-3)$$

12. $x^2y^2 - 3x^2 + 2y^2 - 6$

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