

**Intermediate Algebra**  
**Skill-BUILDER # PF -1**  
**Factoring out the GCF**

Apply the distributive property of multiplication over addition in reverse:

$$ab + ac = a(b + c) \text{ or } ab + ac = (b + c)a$$

Examples

1.  $4x + 4y$

Solution:

$$\boxed{4} \cdot x + \boxed{4} \cdot y = 4(x + y)$$

2.  $ab^2y + 2ab^2z - 9ab^2w$

Solution:

$$\boxed{ab^2} \cdot y + 2 \cdot \boxed{ab^2} \cdot z - 9 \cdot \boxed{ab^2} \cdot w = ab^2(y + 2z - 9w)$$

3.  $12x^2y + 20x^3y^2 = 4x^2y(3 + 5xy)$

Solution:

$$\begin{aligned} 12x^2y + 20x^3y^2 &= \boxed{4x^2y} \cdot 3 + \boxed{4x^2y} \cdot 5xy \\ &= 4x^2y(3 + 5xy) \end{aligned}$$

4.  $30ab^3c - 48a^3bc^2 + 60a^3b^3c^3$

Solution:

$$\begin{aligned} 30ab^3c - 48a^3bc^2 + 60a^3b^3c^3 \\ &= \boxed{3abc} \cdot 10b^2 - \boxed{3abc} \cdot 16a^2c + \boxed{3abc} \cdot 20a^2b^2c^2 \\ &= 3abc(10b^2 - 16a^2c + 20a^2b^2c^2) \end{aligned}$$

5.  $2a(x + y) + 5b(x + y) = (x + y)(2a + 5b)$

Solution:

$$2a \cdot \boxed{(x + y)} + 5b \cdot \boxed{(x + y)} = (x + y)(2a + 5b)$$

6.  $5n(8 - 9x) + 7m(9x - 8)$

Solution:

$$\begin{aligned} 5n(8 - 9x) + 7m(9x - 8) \\ &= 5n \cdot \boxed{(8 - 9x)} - 7m \cdot \boxed{(8 - 9x)} \\ &= (8 - 9x)(5n - 7m) \end{aligned}$$

7.  $8K(2T - 5P) - 11(5P - 2T) = 8K(2T - 5P) + 11(2T - 5P) = (2T - 5P)(8K + 11)$

Solution:

$$\begin{aligned} 8K(2T - 5P) - 11(5P - 2T) \\ &= 8K \cdot \boxed{(2T - 5P)} + 11 \cdot \boxed{(2T - 5P)} \\ &= (2T - 5P)(8K + 11) \end{aligned}$$

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Factor out the GCF:

1.  $an - am - ax + ay$

2.  $2xy + 4x^2y - 10xy^2$

3.  $12y - 18y^2 + 27xy^5$

4.  $-10a^3b^2c^5 + 15a^5b^3c^2 - 75a^2b^5c^3$

5.  $a(3x + 2y) - 2b(3x + 2y)$

6.  $2x^2(3t - 4p) + y^3(4p - 3t)$

7.  $8am(x^2 - 2x) + 10pm(2x - x^2)$

8.  $12pm(18a - 15b) - 9am(15b - 18a)$

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**Answers**

1.  $a(n - m - x + y)$

2.  $2xy(1 + 2x - 5y)$

3.  $3y(4 - 6y + 9xy^4)$

4.  $-5a^2b^2c^2(2ac^3 - 3a^3b + 15b^3c)$

5.  $(3x + 2y)(a - 2b)$

6.  $(3t - 4p)(2x^2 + y^3)$

7.  $2mx(x - 2)(4a + 5p)$

8.  $9m(6a - 5b)(4p - 3a)$

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