



Algebra: Factoring Polynomials by GCF

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DIRECTIONS

Factor each polynomial completely by pulling out the greatest common factor (GCF). The GCF includes the largest numerical factor common to all terms and the lowest power of each variable that appears in every term.

1. Factor:

$$6x + 9$$

Answer: _____

2. Factor:

$$12x^2 - 8x$$

Answer: _____

3. Factor:

$$15x^3 + 25x^2$$

Answer: _____

4. Factor:

$$14a^2b - 21ab^2$$

Answer: _____

5. Factor:

$$18x^4 - 24x^3 + 6x^2$$

Answer: _____

6. Factor:

$$16x^2y - 8xy^2 + 4xy$$

Answer: _____

7. Factor:

$$9x^3y^2 - 27x^2y^3$$

Answer: _____

8. Factor:

$$10a^3 + 20a^2 - 5a$$

Answer: _____

9. Factor:

$$36x^5y^2 - 24x^3y^3 + 12x^2y$$

Answer: _____

10. Factor:

$$5(x - 1) + 10x(x - 1)$$

Answer: _____

Answer Key & Solutions

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TEACHER NOTES

Items 1–3: numeric GCF and one variable. Items 4–6: GCF involves two variables. Items 7–9: larger coefficients with multiple variables. Item 10: binomial GCF — factor out $(x - 1)$.

1. Factor: $6x + 9$

Answer: $3(2x + 3)$

$GCF = 3 \rightarrow 3(2x + 3)$.

2. Factor: $12x^2 - 8x$

Answer: $4x(3x - 2)$

$GCF = 4x \rightarrow 4x(3x - 2)$.

3. Factor: $15x^3 + 25x^2$

Answer: $5x^2(3x + 5)$

$GCF = 5x^2 \rightarrow 5x^2(3x + 5)$.

4. Factor: $14a^2b - 21ab^2$

Answer: $7ab(2a - 3b)$

$GCF = 7ab \rightarrow 7ab(2a - 3b)$.

5. Factor: $18x^4 - 24x^3 + 6x^2$

Answer: $6x^2(3x^2 - 4x + 1)$

$GCF = 6x^2 \rightarrow 6x^2(3x^2 - 4x + 1)$.

6. Factor: $16x^2y - 8xy^2 + 4xy$

Answer: $4xy(4x - 2y + 1)$

$GCF = 4xy \rightarrow 4xy(4x - 2y + 1)$.

7. Factor: $9x^3y^2 - 27x^2y^3$

Answer: $9x^2y^2(x - 3y)$

$GCF = 9x^2y^2 \rightarrow 9x^2y^2(x - 3y)$.

8. Factor: $10a^3 + 20a^2 - 5a$

Answer: $5a(2a^2 + 4a - 1)$

$GCF = 5a \rightarrow 5a(2a^2 + 4a - 1)$.

9. Factor: $36x^4y^2 - 24x^3y^3 + 12x^2y$

Answer: $12x^2y(3x^2y - 2xy^2 + 1)$

$GCF = 12x^2y \rightarrow 12x^2y(3x^2y - 2xy^2 + 1)$.

10. Factor: $5(x - 1) + 10x(x - 1)$

Answer: $5(x - 1)(2x + 1)$

Common binomial $(x - 1)$: $5(x - 1)[1 + 2x] = 5(x - 1)(2x + 1)$.