

# Greatest Common Factor and GCF Factoring

Algebra 1 • Section 8.1

Name: \_\_\_\_\_

Date: \_\_\_\_\_

Score: \_\_\_\_\_ / 12

## Quick Review and Helpful Hints

Polynomial work is pattern work. Keep like terms together, apply exponent rules only when the bases match, and check factoring by multiplying the factors back together.

▷ **Example:** Factor  $x^2 + 9x + 20$ .

**Work:** Look for two numbers that multiply to 20 and add to 9. The numbers are 4 and 5.

★ **Answer:**  $(x + 4)(x + 5)$

## ◆ Practice Problems

Solve each problem. Show enough work that another student could follow your thinking.

1. Factor the GCF from  $12x + 18$ .

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6. Factor  $9x^2 + 3x + 6$ .

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2. Factor  $15a^2 + 10a$ .

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7. Factor  $5x(x + 2) + 3(x + 2)$ .

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3. Factor  $8x^3 - 20x^2$ .

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8. Factor  $4a^3b - 12a^2b^2 + 8ab$ .

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4. Factor  $-6m + 24$ .

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9. Factor  $18r^2 - 27r$ .

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5. Factor  $14p^2q + 21pq^2$ .

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10. Factor  $11x + 22y$ .

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## ◆ Word Problems

11. A rectangle area is  $6x^2 + 15x$ . One side is the GCF. Factor the area.

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12. A total cost is  $20n + 35$ . Factor it to show a common unit.

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## Answer Keys

1.  $6(2x + 3)$

2.  $5a(3a + 2)$

3.  $4x^2(2x - 5)$

4.  $-6(m - 4)$

5.  $7pq(2p + 3q)$

6.  $3(3x^2 + x + 2)$

7.  $(x + 2)(5x + 3)$

8.  $4ab(a^2 - 3ab + 2)$

9.  $9r(2r - 3)$

10.  $11(x + 2y)$

11.  $3x(2x + 5)$

12.  $5(4n + 7)$

### Step-by-Step Explanations

- Find the biggest number dividing both, which is 6, and pull it out front.
- Both terms carry a  $5a$ , so lift that shared piece out of each.
- The most you can take from both terms is  $4x^2$  — grab it and divide what's left.
- Pulling out  $-6$  flips the inside signs, leaving a cleaner positive variable term.
- Look for what's common to both: a 7, a  $p$ , and a  $q$  all come out together.
- There's no shared variable, but every coefficient is divisible by 3, so factor that.
- Both chunks already contain  $(x + 2)$  — treat that whole binomial as the common factor.
- Every term shares  $4ab$ ; once you remove it, divide each piece by what you took.
- A 9 and an  $r$  live in both terms, so factor out  $9r$  together.
- Eleven divides both terms evenly, so it slides out front of the parentheses.
- Both terms share  $3x$ , and pulling it out reveals one side as  $3x$ .
- A 5 divides both terms, so factoring it shows the cost in groups of 5.



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