MATHEMATICS · GRADES 10-12

Choosing the appropriate factoring strategy

Difficulty level: Advanced

Mathematics: Grades 10-12

This document was made by AI and there may be mistakes. If a question or answer looks wrong, use the Flag a mistake button to let Brett know so he can fix it.

Overview of the concept

This is how you pick the fastest way to factor an expression. A mechanic chooses the right tool before starting a job, and factoring works the same way, because trying methods at random wastes time and invites mistakes. Knowing which strategy fits which shape of expression is what makes factoring quick instead of a guessing game.



© 2026 Brett Robbins. All Rights Reserved.

Rule

Choosing a factoring strategy: check for a common factor first, and take it out. Then count the terms inside.

Two terms that are both squares with a minus sign use difference of squares. Three terms with square ends and a middle term equal to twice the square roots of the two ends multiplied together use the perfect-square pattern. If no pattern fits, the expression may be prime, which means it cannot be factored any further.

Worked examples

EXAMPLE 1

Q Factor $12x^2 - 27$

SOLUTION

Check for a GCF (greatest common factor) first: the GCF is 3, giving $3(4x^2 - 9)$.

Count the terms inside: two terms, each a square, joined by a minus sign, so use difference of squares.

Write the result: $3(2x - 3)(2x + 3)$

© 2026 Brett Robbins. All Rights Reserved.

EXAMPLE 2

Q Factor $x^2 + 6x + 9$

SOLUTION

Check for a GCF first: there is none besides 1.

Count the terms: three of them, squared at both ends, with the middle term twice the square roots of the two ends (x and 3) multiplied together, so use the perfect-square pattern.

Write the result: $(x + 3)^2$

Practice questions

1 Factor $18x^2 - 50$

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

B $(3x - 5)(3x + 5)$

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

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

Understand It with Pulse | Flag a mistake

© 2026 Brett Robbins. All Rights Reserved.

2 Factor $x^2 + 12x + 36$

A $(x - 6)^2$

B $(x + 6)^2$

C $(x + 6)(x - 6)$

D $(x + 3)^2$

Understand It with Pulse | Flag a mistake

3 Factor $2x^2 + 10x + 12$

A $2(x + 2)(x - 3)$

B $(x + 2)(x + 3)$

C $2(x + 2)(x + 3)$

D $2(x - 2)(x - 3)$

Understand It with Pulse | Flag a mistake

© 2026 Brett Robbins. All Rights Reserved.

4 Factor $x^3 + 2x^2 + 3x + 6$ by grouping.

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

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

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

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

Understand It with Pulse | Flag a mistake

5 Factor $x^2 - 121$

A $(x - 11)^2$

B $(x + 11)^2$

C $(x - 11)(x + 11)$

D $(11 - x)(11 + x)$

Understand It with Pulse | Flag a mistake

© 2026 Brett Robbins. All Rights Reserved.

6 Factor $5x^2 + 20x + 20$

A $5(x - 2)^2$

B $(x + 2)^2$

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

D $5(x + 2)^2$

Understand It with Pulse | Flag a mistake

7 Factor $x^3 - 8$

A $(x + 2)(x^2 - 2x + 4)$

B $(x - 2)(x^2 + 2x + 4)$

C $(x - 2)^3$

D $(x - 2)(x^2 - 2x + 4)$

Understand It with Pulse | Flag a mistake

© 2026 Brett Robbins. All Rights Reserved.

8 Factor $3x^2 + 12x + 9$

A $3(x - 1)(x - 3)$

B $3(x + 1)(x + 3)$

C $(x + 1)(x + 3)$

D $3(x + 3)^2$

Understand It with Pulse | Flag a mistake

9 Factor $4x^2 - 9$

A $(2x - 3)^2$

B $(2x - 3)(2x + 3)$

C $(2x + 3)^2$

D $(2x - 9)(2x + 9)$

Understand It with Pulse | Flag a mistake

© 2026 Brett Robbins. All Rights Reserved.

10 Factor $x^2 + 8x + 16$

A $(x - 4)^2$

B $(x + 4)(x - 4)$

C $(x + 2)^2$

D $(x + 4)^2$

Understand It with Pulse | Flag a mistake

© 2026 Brett Robbins. All Rights Reserved.

ANSWER KEY

1. $2(3x - 5)(3x + 5)$

2. $(x + 6)^2$

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

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

5. $(x - 11)(x + 11)$

6. $5(x + 2)^2$

7. $(x - 2)(x^2 + 2x + 4)$

8. $3(x + 1)(x + 3)$

9. $(2x - 3)(2x + 3)$

10. $(x + 4)^2$

© 2026 Brett Robbins. All Rights Reserved.