MATHEMATICS · GRADES 10-12

# Expanding versus factoring

**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 tell the two opposite directions of algebra apart. Expanding builds a formula up, factoring takes it apart, and knowing which direction you need is half the job. It is like knowing whether to build something up or take it apart when you are checking a measurement. Mix them up and you head the wrong way, get them right and the problem opens up.



## *Rule*

**Expanding versus factoring: expanding builds a product up, multiplying brackets out into a sum. Factoring takes a sum apart, writing it as a product of brackets.**

Expanding and factoring are opposites: factoring reverses expanding. If the question gives brackets, expand. If it gives a sum, factor.

© 2026 Brett Robbins. All Rights Reserved.

## Worked examples

EXAMPLE 1

### Q Expand $(x + 3)(x + 2)$

**SOLUTION**

Multiply the first terms: $x \times x = x^2$

Multiply the outer and inner terms and add: $2x + 3x = 5x$. Multiply the last terms: $3 \times 2 = 6$

Write the expanded form: $x^2 + 5x + 6$

EXAMPLE 2

### Q Factor $x^2 - 7x + 12$

**SOLUTION**

$__ \times __ = 12$

$__ + __ = -7$

$-3 \times -4 = 12$ and $-3 + -4 = -7$, so the numbers are $-3$ and $-4$

Write the brackets: $(x - 3)(x - 4)$

This is factoring: it reverses expanding, going from the trinomial back to brackets.

© 2026 Brett Robbins. All Rights Reserved.

## Practice questions

**1** $(x + 4)(x + 3)$. Expand it.

- **A** $x^2 + 7x + 7$
- **B** $x^2 + 7x + 12$
- **C** $x^2 + 12x + 12$
- **D** $x^2 + 3x + 12$

Understand It with Pulse | Flag a mistake

**2** $x^2 + 9x + 20$. Factor it.

- **A** $(x + 4)(x + 5)$
- **B** $(x + 2)(x + 10)$
- **C** $(x + 5)(x + 5)$
- **D** $(x + 4)(x + 4)$

Understand It with Pulse | Flag a mistake

© 2026 Brett Robbins. All Rights Reserved.

**3** $(x - 5)(x + 2)$. Expand it.

- **A** $x^2 - 3x - 10$
- **B** $x^2 - 3x + 10$
- **C** $x^2 + 3x - 10$
- **D** $x^2 - 7x - 10$

Understand It with Pulse | Flag a mistake

**4** $x^2 - 8x + 15$. Factor it.

- **A** $(x + 3)(x + 5)$
- **B** $(x - 3)(x - 5)$
- **C** $(x - 5)(x - 5)$
- **D** $(x - 3)(x + 5)$

Understand It with Pulse | Flag a mistake

© 2026 Brett Robbins. All Rights Reserved.

**5** $(2x + 1)(x + 4)$. Expand it.

- **A** $2x^2 + 8x + 4$
- **B** $2x^2 + 9x + 4$
- **C** $2x^2 + 9x + 5$
- **D** $x^2 + 9x + 4$

Understand It with Pulse | Flag a mistake

**6** $2x^2 + 7x + 3$. Factor it.

- **A** $(2x + 1)(x + 3)$
- **B** $(2x + 3)(x + 1)$
- **C** $(x + 1)(x + 3)$
- **D** $(2x + 1)(x + 1)$

Understand It with Pulse | Flag a mistake

© 2026 Brett Robbins. All Rights Reserved.

**7** $(x - 3)(x - 3)$. Expand it.

A $x^2 + 6x + 9$

B $x^2 - 6x - 9$

C $x^2 - 6x + 9$

D $x^2 - 3x + 9$

Understand It with Pulse | Flag a mistake

**8** $x^2 - 9$. Factor it.

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

B $(x - 9)(x + 1)$

C $(x - 3)(x - 3)$

D $(x + 9)(x - 1)$

Understand It with Pulse | Flag a mistake

© 2026 Brett Robbins. All Rights Reserved.

**9** $(x - 4)(x + 4)$. Expand it.

- **A** $x^2 - 16$
- **B** $x^2 - 8x - 16$
- **C** $x^2 + 16$
- **D** $x^2 - 8x + 16$

Understand It with Pulse | Flag a mistake

**10** $x^2 + 4x - 12$. Factor it.

- **A** $(x + 3)(x - 4)$
- **B** $(x + 6)(x - 2)$
- **C** $(x + 6)(x + 2)$
- **D** $(x - 6)(x + 2)$

Understand It with Pulse | Flag a mistake

© 2026 Brett Robbins. All Rights Reserved.

## ANSWER KEY

**1.** $x^2 + 7x + 12$

**2.** $(x + 4)(x + 5)$

**3.** $x^2 - 3x - 10$

**4.** $(x - 3)(x - 5)$

**5.** $2x^2 + 9x + 4$

**6.** $(2x + 1)(x + 3)$

**7.** $x^2 - 6x + 9$

**8.** $(x - 3)(x + 3)$

**9.** $x^2 - 16$

**10.** $(x + 6)(x - 2)$

© 2026 Brett Robbins. All Rights Reserved.