

GCSE Maths: Factorising quadratic expressions (Higher): answers

GCSE Maths - Quadratic and Simultaneous Equations - Higher - Lesson 14.1

Answers. Final answers to the worksheet questions. Full step-by-step solutions for every question are free at websink.site/gcse/maths/ch14-quadratics-simultaneous/higher/factorising-quadratic-expressions/

Exercise 14A Factorising quadratic expressions Non-calculator

1 Factorise by taking out the highest common factor.

(a) $6x + 9$

Answer: $3(2x + 3)$

(b) $10x - 15$

Answer: $5(2x - 3)$

(c) $x^2 + 5x$

Answer: $x(x + 5)$

(d) $4x^2 - 12x$

Answer: $4x(x - 3)$

(e) $9x^2 + 6x$

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

(f) $8x^2 - 8x$

Answer: $8x(x - 1)$

2 Factorise.

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

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

(b) $x^2 + 7x + 10$

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

(c) $x^2 + 8x + 15$

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

(d) $x^2 + 9x + 20$

Answer: $(x + 4)(x + 5)$

(e) $x^2 + 6x + 8$

Answer: $(x + 2)(x + 4)$

(f) $x^2 + 10x + 24$

Answer: $(x + 4)(x + 6)$

3 Factorise.

(a) $x^2 - 6x + 8$

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

(b) $x^2 - 7x + 10$

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

(c) $x^2 - 8x + 15$

Answer: $(x - 3)(x - 5)$

(d) $x^2 - 9x + 14$

Answer: $(x - 2)(x - 7)$

(e) $x^2 - 10x + 21$

Answer: $(x - 3)(x - 7)$

(f) $x^2 - 5x + 4$

Answer: $(x - 1)(x - 4)$

4 Factorise.

(a) $x^2 + 2x - 8$

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

(b) $x^2 + x - 12$

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

(c) $x^2 - 3x - 10$

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

(d) $x^2 - 2x - 15$

Answer: $(x + 3)(x - 5)$

(e) $x^2 + 4x - 21$

Answer: $(x - 3)(x + 7)$

(f) $x^2 - x - 20$

Answer: $(x + 4)(x - 5)$

5 Factorise these differences of two squares.

(a) $x^2 - 9$

Answer: $(x - 3)(x + 3)$

(b) $x^2 - 16$

Answer: $(x - 4)(x + 4)$

(c) $x^2 - 100$

Answer: $(x - 10)(x + 10)$

(d) $x^2 - 1$

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

(e) $4x^2 - 25$

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

(f) $9x^2 - 4$

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

- 6 Zara says that $x^2 + 8x + 12 = (x + 3)(x + 4)$. Explain why she is wrong and write the correct factorisation.

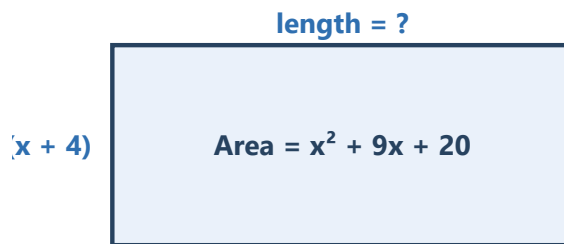
Answer: $(x + 3)(x + 4)$ expands to $x^2 + 7x + 12$, not $+8x$. Correct: $(x + 2)(x + 6)$

- 7 Three of these four expressions can be factorised into two brackets. Which one cannot?

$x^2 + 6x + 9$, $x^2 - 25$, $x^2 + 4x + 5$, $x^2 - 5x + 6$

Answer: $x^2 + 4x + 5$

- 8 The area of this rectangle is $(x^2 + 9x + 20) \text{ cm}^2$. The width is $(x + 4) \text{ cm}$. Find an expression for the length.



Answer: $(x + 5) \text{ cm}$

- 9 Factorise.

(a) $x^2 + 12x + 35$

Answer: $(x + 5)(x + 7)$

(b) $x^2 - 4x$

Answer: $x(x - 4)$

(c) $7x - 21$

Answer: $7(x - 3)$

(d) $x^2 - 144$

Answer: $(x - 12)(x + 12)$

(e) $x^2 - 11x + 28$

Answer: $(x - 4)(x - 7)$

(f) $x^2 + 3x - 28$

Answer: $(x - 4)(x + 7)$

10 Use the difference of two squares to work out, **without a calculator**.

(a) $52^2 - 48^2$

Answer: 400

(b) $101^2 - 99^2$

Answer: 400

11 Factorise.

(a) $2x^2 + 7x + 3$

Answer: $(x + 3)(2x + 1)$

(b) $3x^2 + 10x + 8$

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

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

Answer: $(x - 3)(2x + 1)$

(d) $5x^2 - 11x + 2$

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

(e) $6x^2 + x - 2$

Answer: $(2x - 1)(3x + 2)$

(f) $4x^2 - 4x - 3$

Answer: $(2x - 3)(2x + 1)$

12 Factorise fully (take out the common factor first).

(a) $2x^2 - 50$

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

(b) $3x^2 + 15x + 18$

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

(c) $5x^2 - 45$

Answer: $5(x - 3)(x + 3)$

(d) $2x^2 - 12x + 16$

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

(e) $6x^2 + 9x$

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

(f) $4x^2 - 36$

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

- 13** Show that $(2n + 1)^2 - (2n - 1)^2$ is a multiple of 8 for every positive whole number n .

Answer: $= 8n$, which is a multiple of 8

- 14** The expression $x^2 + bx + 12$ can be factorised into two brackets with whole numbers in them for certain values of b . How many different values of b (positive or negative) are possible? List them.

Answer: 6 values: $-13, -8, -7, 7, 8, 13$