

Factorising Quadratics

ANSWERS

1

Factorise $x^2 + 7x + 12$

Multiply to 12	Add to 7?
1 × 12	13
2 × 6	8
3 × 4	7 ✓

×	x	$+3$
x	x^2	$+3x$
$+4$	$+4x$	$+12$

Find two numbers that multiply to 12 and add to 7.

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

2

Factorise $x^2 + 8x + 15$

Multiply to 15	Add to 8?
1 × 15	16
3 × 5	8 ✓

×	x	$+3$
x	x^2	$+3x$
$+5$	$+5x$	$+15$

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

3

Factorise $x^2 + 9x + 20$

Multiply to 20	Add to 9?
1 × 20	21
2 × 10	12
4 × 5	9 ✓

×	x	$+4$
x	x^2	$+4x$
$+5$	$+5x$	$+20$

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

4

Factorise $x^2 + 2x - 8$

Multiply to -8	Add to 2?
1 × -8	-7
-1 × 8	7
2 × -4	-2
-2 × 4	2 ✓

×	x	-2
x	x^2	$-2x$
$+4$	$+4x$	-8

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

5

Factorise $x^2 - 7x + 10$

×	x	-5
x	x^2	$-5x$
-2	$-2x$	$+10$

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

6

Factorise $x^2 + x - 12$

×	x	-3
x	x^2	$-3x$
$+4$	$+4x$	-12

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

7

A rectangle has an area of $x^2 + 7x + 12$. Find expressions for the lengths of its sides.

$$3 \times 4 = 12 \text{ and } 3 + 4 = 7$$

Answer $(x + 3)$ and $(x + 4)$

8

Solve $x^2 + 5x + 6 = 0$

$$(x + 2)(x + 3) = 0$$

Answer $x = -2$ or -3

Factorising Quadratics further practice

ANSWERS

9

Factorise $x^2 - 9x + 18$

$$-3 \times -6 = 18 \text{ and } -3 + -6 = -9$$

Answer $(x - 3)(x - 6)$

10

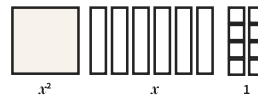
Factorise $12 + x^2 - 7x$

$$\text{write it as } x^2 - 7x + 12$$

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

11

Ella has these tiles: one x by x square, six x by 1 strips and eight 1 by 1 squares. She puts them all together to make a rectangle. What are its side lengths?



$$x^2 + 6x + 8 = (x + 2)(x + 4)$$

Answer $x + 2$ and $x + 4$

12

Factorise $x^2 - 16$

$$4 \times -4 = -16 \text{ and } 4 + -4 = 0$$

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

13

A square has an area of $(x^2 + 10x + 25) \text{ cm}^2$. Find an expression for its side length and for its perimeter.

$$x^2 + 10x + 25 = (x + 5)(x + 5)$$

Side $(x + 5) \text{ cm}$

Perimeter $(4x + 20) \text{ cm}$

14

Factorise fully $2x^2 + 10x + 12$

$$\text{take out 2 first: } 2(x^2 + 5x + 6)$$

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

15

Factorise $x^2 + 2x - 15$. Use your answer to work out $25^2 + 2 \times 25 - 15$ without a calculator.

$$30 \times 22$$

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

Value 660

16

x is a positive whole number. Explain why $x^2 + 8x + 15$ can never be a prime number.

$$x^2 + 8x + 15 = (x + 3)(x + 5)$$

$x + 3$ and $x + 5$ are both bigger than 1

so it has a factor that is not 1 or itself