Solutions by
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GCSE (9-1) Grade 5 Solving Quadratics by factorisation

Instructions

Use **black** ink or ball-point pen.
Fill in the boxes at the top of this page with your name.
Answer **all** questions.
Answer the questions in the spaces provided
– there may be more space than you need.
Show all your working out

Information

The marks for **each** question are shown in brackets.
use this as a guide as to how much time to spend on each question.
Questions labelled with an **asterisk** (*) are ones where the quality of your written communication will be assessed

Advice

Read each question carefully before you start to answer it
Attempt every question
Check your answers if you have time at the end

1. (i) Factorise $x^2 - 4x - 45$

$(x - 9)(x + 5)$

(ii) Solve the equation

$$x^2 - 4x - 45 = 0$$

$x = 9 \quad x = -5$

(Total 3 marks)

2. (i) Factorise $x^2 - 7x + 12$

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

(ii) Solve the equation

$$x^2 - 7x + 12 = 0$$

$x = 3 \quad x = 4$

(Total 3 marks)

3. (a) Factorise $x^2 - 3x - 18$

$(x-6)(x+3)$

(2)

(b) Solve $x^2 - 3x - 18 = 0$

$x =$ 6

or $x =$ -3

(1)

(Total 3 marks)

4. (a) Factorise $x^2 + 6x + 8$

$(x+4)(x+2)$

(2)

(b) Solve $x^2 + 6x + 8 = 0$

$x =$ -4

or $x =$ -2

(1)

(Total 3 marks)

5. (a) Factorise $x^2 - x - 56$

$(x-8)(x+7)$

(2)

(b) Solve $x^2 - x - 56 = 0$

$x = 8$

or $x = -7$

(1)

(Total 3 marks)

6. (i) Factorise $x^2 + 9x + 20$

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

(ii) Solve the equation

$x^2 + 9x + 20 = 0$

$x = -4$ $x = -5$

(Total 3 marks)

7. (i) Factorise $x^2 - 12x + 35$

$(x-7)(x-5)$

(ii) Solve the equation

$$x^2 - 12x + 35 = 0$$

$x=7 \quad x=5$

(Total 3 marks)

8. (i) Factorise $x^2 - x - 72$

$(x+8)(x-9)$

(ii) Solve the equation

$$x^2 - x - 72 = 0$$

$x=-8 \quad x=9$

(Total 3 marks)

9. (a) Factorise $x^2 - 15x + 56$

$(x - 7)(x - 8)$

(2)

(b) Solve $x^2 - 15x + 56 = 0$

$x =$ 7

or $x =$ 8

(1)

(Total 3 marks)

10. (a) Factorise $x^2 + 9x + 18$

$(x + 6)(x + 3)$

(2)

(b) Solve $x^2 + 9x + 18 = 0$

$x =$ -6

or $x =$ -3

(1)

(Total 3 marks)

11. (a) Factorise $x^2 - 2x - 48$

$(x - 8)(x + 6)$

(2)

(b) Solve $x^2 - 2x - 48 = 0$

$x =$ 8

or $x =$ -6

(1)

(Total 3 marks)

12. (i) Factorise $x^2 + 10x + 24$

$(x + 6)(x + 4)$

(ii) Solve the equation

$x^2 + 10x + 24 = 0$

$x = -6 \quad x = -4$

(Total 3 marks)

13.

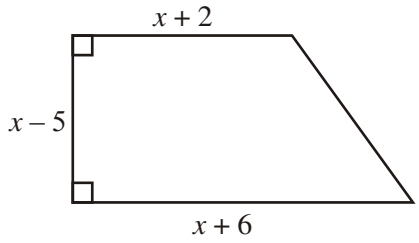


Diagram **NOT** accurately drawn

The diagram shows a trapezium.
The lengths of three of the sides of the trapezium are $x - 5$, $x + 2$ and $x + 6$.
All measurements are given in centimetres.

The area of the trapezium is 36 cm^2.

(a) Show that $x^2 - x - 56 = 0$

$\frac{1}{2}(x+2+x+6) \times (x-5) = 36$

$\frac{1}{2}(2x+8)(x-5) = 36$

$(x+4)(x-5) = 36$

$x^2 - x - 20 = 36$

$x^2 - x - 56 = 0$

(4)

(b) (i) Solve the equation $x^2 - x - 56 = 0$

$(x-8)(x+7) = 0$

$x = 8$

(ii) Hence find the length of the shortest side of the trapezium.

$8 - 5 = 3$ cm

(4)

(Total 8 marks)

14. The diagram below shows a 6-sided shape.

All the corners are right angles.

All measurements are given in centimetres.

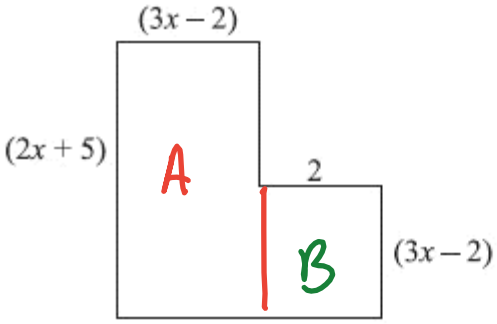


Diagram **NOT** accurately drawn

The area of the shape is 25 cm^2.

(a) Show that $6x^2 + 17x - 39 = 0$

A: $(3x-2)(2x+5) = 6x^2 + 11x - 10$

B: $2(3x-2) = 6x - 4$

$6x^2 + 17x - 14 = 25$

$6x^2 + 17x - 39 = 0$ **(3)**

(b) (i) Solve the equation

$6x^2 + 17x - 39 = 0$

$(3x + 13)(2x - 3)$

$x = -\frac{13}{3}$ or $x = \frac{3}{2}$

(ii) Hence work out the length of the longest side of the shape.

$2 \times \frac{3}{2} + 5 = 8$ ..... cm

(4)

(Total 7 marks)