

Name:

Exam Style Questions

Solving Quadratics by Factorising



Corbettmaths

Equipment needed: Pen, Calculator

Guidance

1. Read each question carefully before you begin answering it.
2. Check your answers seem right.
3. Always show your workings

Video Tutorial

www.corbettmaths.com/contents

Video 266

Answers and Video Solutions

1. Solve $(x - 2)(x + 9) = 0$



$$x = 2 \text{ or } x = -9$$

$$\underline{x = 2 \text{ or } x = -9}$$

(1)

2. Circle the two roots of $(x - 6)(x + 1) = 0$



-6 (-1) 1 (6)

(1)

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



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

$$x = -2 \text{ or } x = -3$$

$$\underline{x = -3 \text{ or } x = -2}$$

(2)

4. Solve $x^2 + 9x + 14 = 0$



$$(x + 7)(x + 2) = 0$$

$$x = -7 \text{ or } x = -2$$

$$\underline{x = -7 \text{ or } x = -2}$$

(2)

5. Solve $x^2 + 21x + 20 = 0$



$$(x + 1)(x + 20) = 0$$

$$x = -1 \text{ or } x = -20$$

$$\underline{x = -1 \text{ or } x = -20}$$

(2)

6. Solve $x^2 - 3x - 18 = 0$



$$(x - 6)(x + 3) = 0$$

$$x = 6 \text{ or } x = -3$$

$$\underline{x = -3 \text{ or } x = 6}$$

(2)

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



$$(x + 4)(x - 3) = 0$$

$$x = -4 \text{ or } x = 3$$

$$\underline{x = -4 \text{ or } x = 3}$$

(2)

8. Solve $x^2 - x - 6 = 0$



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

$$x = 3 \text{ or } x = -2$$

$$\underline{x = -2 \text{ or } x = 3}$$

(2)

9. Solve $x^2 - 49 = 0$



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

$$x = 7 \text{ or } x = -7$$

$$\underline{x = -7 \text{ or } x = 7}$$

(2)

10. Solve $x^2 - 2x - 8 = 0$



$$(x - 4)(x + 2) = 0$$

$$x = 4 \text{ or } x = -2$$

$$\underline{x = -2 \text{ or } x = 4}$$

(2)

11. Solve $x^2 + 10x - 24 = 0$



$$(x + 12)(x - 2) = 0$$

$$x = -12 \text{ or } x = 2$$

$$\underline{x = -12 \text{ or } x = 2}$$

(2)

12. Solve $x^2 - 13x + 30 = 0$



$$(x - 3)(x - 10) = 0$$

$$x = 3 \text{ or } x = 10$$

$$\underline{x = 3 \text{ or } x = 10}$$

(2)

13. Solve $y^2 + 4y - 12 = 0$



$$(y + 6)(y - 2) = 0$$

$$y = -6 \text{ or } y = 2$$

$$\underline{y = -6 \text{ or } y = 2}$$

(2)

14. Solve $m^2 + 24m + 63 = 0$



$$(m + 21)(m + 3) = 0$$

$$m = -21 \text{ or } m = -3$$

$$\underline{m = -21 \text{ or } m = -3}$$

(2)

15. Solve $m^2 - 16m + 64 = 0$



$$(m - 8)(m - 8) = 0$$

$$m = 8$$

$$\underline{m = 8}$$

(2)

16. The two solutions to $x^2 + bx + c = 0$ are $x = -8$ and $x = -2$



Find the values of b and c

$$(x + 8)(x + 2) = 0$$

$$x^2 + 10x + 16 = 0$$

$$b = \underline{10} \quad c = \underline{16}$$

(2)

17. The equation $x^2 + bx + c = 0$ has one solution of $x = -3$



Find the values of b and c

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

$$x^2 + 6x + 9 = 0$$

$$b = \dots\dots\dots 6 \quad c = \dots\dots\dots 9$$

(2)

18. Solve $y^2 - 6y = 27$



$$y^2 - 6y - 27 = 0$$

$$(y-9)(y+3) = 0$$

$$y = 9 \text{ or } y = -3$$

$$\underline{y = 9 \text{ or } y = -3}$$

(2)

19. Solve $w^2 + 2w = 8$



$$w^2 + 2w - 8 = 0$$

$$(w+4)(w-2) = 0$$

$$w = -4 \text{ or } w = 2$$

$$\underline{w = -4 \text{ or } w = 2}$$

(2)

20. Solve $x^2 = 8x - 15$



$$x^2 - 8x + 15 = 0$$

$$(x-5)(x-3) = 0$$

$$x = 5 \text{ or } x = 3$$

$$\underline{x = 5 \text{ or } x = 3}$$

(2)

21. Solve $x^2 + 70 = 17x$



$$x^2 - 17x + 70 = 0$$

$$(x - 10)(x - 7) = 0$$

$$x = 10 \text{ or } x = 7$$

$$\underline{x = 10 \text{ or } x = 7}$$

(2)

22. Solve $y^2 + 9y + 2 = 8y + 58$



$$y^2 + y - 56 = 0$$

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

$$y = -8 \text{ or } y = 7$$

$$\underline{y = -8 \text{ or } y = 7}$$

(2)

23. Solve $(2x - 1)(x - 3) = 0$



$$2x - 1 = 0 \quad x = 3$$

$$2x = 1$$

$$x = \frac{1}{2}$$

$$\underline{x = \frac{1}{2} \text{ or } x = 3}$$

(2)

24. Solve $(4x + 3)(5x - 2) = 0$



$$4x + 3 = 0 \quad 5x - 2 = 0$$

$$4x = -3 \quad 5x = 2$$

$$x = -\frac{3}{4} \quad x = \frac{2}{5}$$

$$\underline{x = -\frac{3}{4} \text{ or } x = \frac{2}{5}}$$

(2)

25. Solve $2x^2 + 5x + 2 = 0$



$$(2x + 1)(x + 2) = 0$$

$$2x + 1 = 0 \quad \text{or} \quad x = -2$$

$$2x = -1$$

$$x = -\frac{1}{2}$$

$$x = -\frac{1}{2} \quad \text{or} \quad x = -2$$

(3)

26. Solve $5x^2 + 19x - 4 = 0$



$$(5x - 1)(x + 4) = 0$$

$$5x - 1 = 0 \quad \text{or} \quad x = -4$$

$$5x = 1$$

$$x = \frac{1}{5}$$

$$x = \frac{1}{5} \quad \text{or} \quad x = -4$$

(3)

27. Solve $2x^2 - 11x + 15 = 0$



$$(x - 3)(2x - 5) = 0$$

$$x = 3 \quad \text{or} \quad x = \frac{5}{2}$$

$$x = 3 \quad \text{or} \quad x = \frac{5}{2}$$

(3)

28. Solve $4x^2 - 9 = 0$



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

$$x = \frac{3}{2} \quad \text{or} \quad x = -\frac{3}{2}$$

$$\underline{x = \frac{3}{2} \quad \text{or} \quad x = -\frac{3}{2}}$$

(2)

29. Solve $3x^2 - 2x - 8 = 0$



$$(x - 2)(3x + 4) = 0$$

$$x = 2 \quad \text{or} \quad x = -\frac{4}{3}$$

$$\underline{x = 2 \quad \text{or} \quad x = -\frac{4}{3}}$$

(3)

30. Solve $4x^2 + 12x + 5 = 0$



$$(2x + 1)(2x + 5) = 0$$

$$x = -\frac{1}{2} \quad \text{or} \quad x = -\frac{5}{2}$$

$$\underline{x = -\frac{1}{2} \quad \text{or} \quad x = -\frac{5}{2}}$$

(3)

31. Solve $6x^2 + 47x - 8 = 0$



$$(6x - 1)(x + 8) = 0$$

$$x = \frac{1}{6} \quad \text{or} \quad x = -8$$

$$\underline{x = \frac{1}{6} \quad \text{or} \quad x = -8}$$

(3)

32. Solve $5y^2 + 8y - 100 = y^2 + 4y - 37$



$$4y^2 + 4y - 63 = 0$$

$$(2y + 9)(2y - 7) = 0$$

$$2y = -9 \quad 2y = 7$$

$$y = -\frac{9}{2} \quad \text{or} \quad y = \frac{7}{2}$$

$$\text{or } y = -4.5 \quad \text{or } y = 3.5$$

.....
(3)

33. Victor is y years old.



His brother Fred is four years old than Victor. $y + 4$

The product of their ages is 780.

(a) Set up an equation to represent this information.

$$y(y + 4) = 780$$

$$y^2 + 4y = 780$$

$$y^2 + 4y - 780 = 0$$

.....
(2)

(b) Solve your equation from (a) to find Victor's age.

$$(y + 30)(y - 26) = 0$$

$$y = -30 \quad \text{or} \quad y = 26$$

\times \checkmark

26

.....
(2)

34. A rectangular field is 30m longer than wide.
The area of the field is 8800m²



Work out the perimeter of the field.

$$x(x+30) = 8800$$

$$x^2 + 30x - 8800 = 0$$

$$(x+110)(x-80) = 0$$

$$x = -110 \quad \text{or} \quad x = 80$$

x ✓

$$80 + 110 + 80 + 110$$

$$= 380 \text{ m}$$

380

.....m
(4)

35. The perpendicular height of a triangle is $x + 9$ cm
The base of the triangle is x cm
The triangle has an area of 95cm²



(a) Show that $x^2 + 9x - 190 = 0$

$$\frac{1}{2} x(x+9) = 95$$

$$x(x+9) = 190$$

$$x^2 + 9x - 190 = 0$$

(2)

(b) Solve the equation to find the value of x

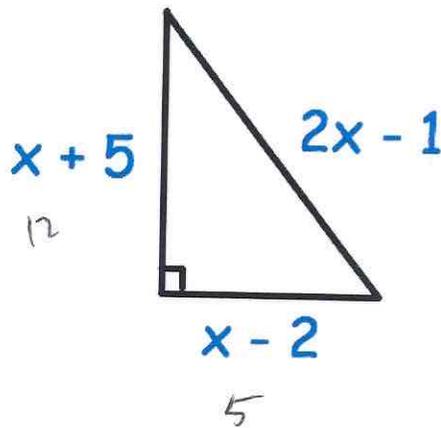
$$(x-10)(x+19) = 0$$

$$x = 10 \quad x = -19$$

✓ x

x =10
(2)

36.



Shown is a right angled triangle with sides are measured in centimetres.

(a) Show that $x^2 - 5x - 14 = 0$

$$(x-2)^2 + (x+5)^2 = (2x-1)^2$$

$$x^2 - 4x + 4 + x^2 + 10x + 25 = 4x^2 - 4x + 1$$

$$2x^2 + 6x + 29 = 4x^2 - 4x + 1$$

$$0 = 2x^2 - 10x - 28$$

$$0 = x^2 - 5x - 14 \quad \checkmark$$

(4)

(b) Find x .

$$(x-7)(x+2) = 0$$

$$x = 7 \text{ or } x = -2$$

7

.....cm
(2)

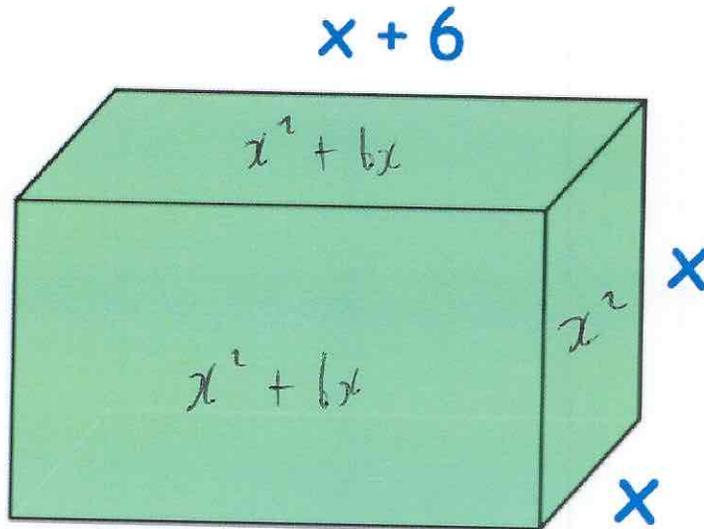
(c) Find the area of the triangle.

$$\frac{1}{2} \times 5 \times 12$$

$$= 30$$

30
.....cm²
(1)

37.



$$\begin{array}{r}
 x^2 + 6x \\
 x^2 + 6x \\
 x^2 + 6x \\
 x^2 + 6x \\
 x^2 \\
 x^2 \\
 + \\
 \hline
 6x^2 + 24x
 \end{array}$$

The surface area of the cuboid is 270cm^2

(a) Show $x^2 + 4x - 45 = 0$

$$6x^2 + 24x = 270$$

$$6x^2 + 24x - 270 = 0$$

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

(4)

(b) Find x

$$(x+9)(x-5) = 0$$

$$x = -9 \text{ or } x = 5$$

5

.....cm
(2)

(c) Find the volume of the cuboid.

$$5 \times 5 \times 11$$

275
..... cm^2
(1)

38. Solve



$$\frac{25}{m+3} = m+3$$

$$25 = (m+3)(m+3)$$

$$25 = m^2 + 6m + 9$$

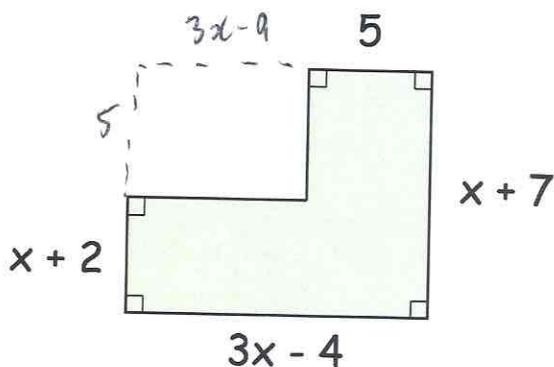
$$m^2 + 6m - 16 = 0$$

$$0 = (m+8)(m-2)$$

$$m = -8 \text{ or } m = 2 \quad m = \dots -8 \dots \text{ or } m = \dots 2 \dots$$

(2)

39. The area of the shape below is 137cm^2



(a) Show that $3x^2 + 2x - 120 = 0$

$$(3x-4)(x+7) - 5(3x-9) = 137$$

$$3x^2 + 17x - 28 - 15x + 45 = 137$$

$$3x^2 + 2x - 120 = 0 \quad \checkmark$$

$$(3x+20)(x-6) = 0$$

(3)

(b) Solve the equation to find the value of x

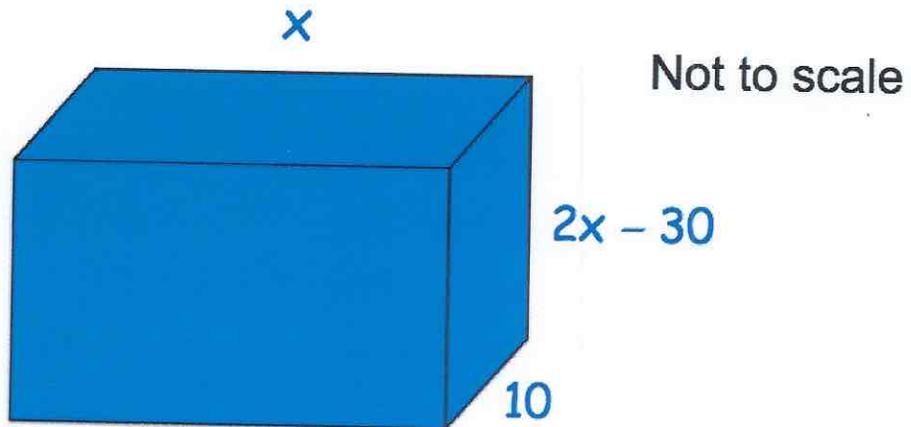
$$\rightarrow (3x+20)(x-6) = 0$$

$$x = -\frac{20}{3} \quad x = 6 \quad \checkmark$$

$$x = \dots 6 \dots$$

(2)

40. The diagram shows a cuboid.
The volume of the cuboid is 5000cm^3



- (a) Show $2x^2 - 30x - 500 = 0$

$$x \times 10 \times (2x - 30) = 5000$$

$$10x(2x - 30) = 5000$$

$$20x^2 - 300x = 5000$$

$$20x^2 - 300x - 5000 = 0$$

$$2x^2 - 30x - 500 = 0 \quad \checkmark$$

(3)

- (b) Solve $2x^2 - 30x - 500 = 0$ to find x , the length of the cuboid.

$$(x - 25)(x + 10) = 0$$

$$x = 25 \quad \text{or} \quad x = -10$$

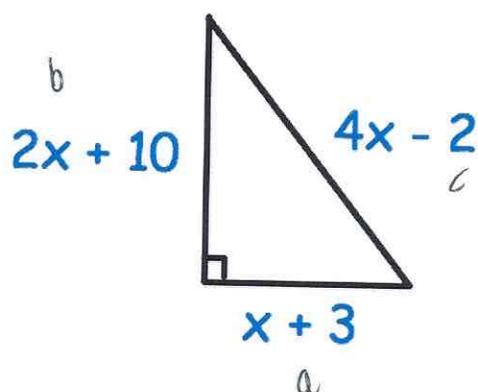
\checkmark

25

.....cm

(3)

41. Shown below is a right angled triangle.



Show that $11x^2 - 62x - 105 = 0$

$$a^2 + b^2 = c^2$$

$$(x+3)^2 + (2x+10)^2 = (4x-2)^2$$

$$x^2 + 6x + 9 + 4x^2 + 40x + 100 = 16x^2 - 16x + 4$$

$$5x^2 + 46x + 109 = 16x^2 - 16x + 4$$

$$0 = 11x^2 - 62x - 105$$



(4)

42. $(3^{x-7})^{x-5} = 27$



Find the possible values of x .

$$3^{(x-7)(x-5)} = 3^3$$

$$\therefore (x-7)(x-5) = 3$$

$$x^2 - 12x + 35 = 3$$

$$x^2 - 12x + 32 = 0$$

$$(x-4)(x-8) = 0$$

$$x=4 \text{ or } x=8$$

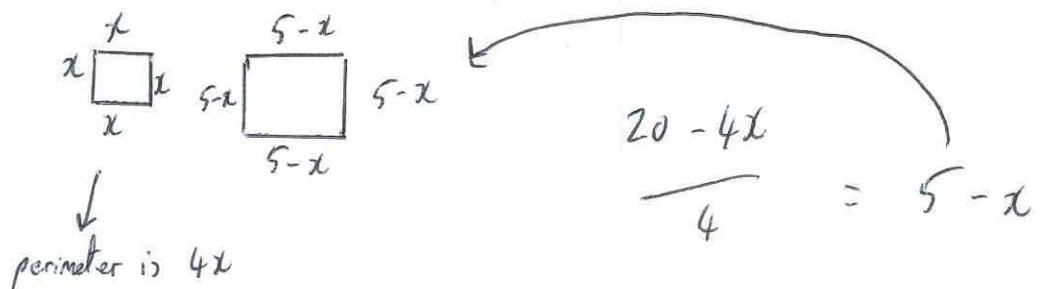
$$x=4 \text{ or } x=8$$

(3)

43. A wire of length 20cm is cut into **two** pieces, each of which is bent into a square.



(a) If the length of the side of one square is x cm, show that the length of the side of the other square is $(5 - x)$ cm



(2)

The **total** area of the two squares is 14.5cm^2

(b) Find the lengths of the two pieces of wire.

$$x^2 + (5-x)^2 = 14.5$$

$$x^2 + 25 - 10x + x^2 = 14.5$$

$$2x^2 - 10x + 10.5 = 0$$

$$4x^2 - 20x + 21 = 0$$

$$(2x - 3)(2x - 7) = 0$$

$$2x = 3 \quad 2x - 7 = 0$$

$$x = \frac{3}{2} \quad 2x = 7$$

$$x = \frac{7}{2}$$

$$4 \times 1.5 = 6$$

..... 6 and 14 cm
(4)

44. The first three terms of a geometric sequence are 2, $4x$ and $x + 30$



(a) Find the possible values of x .

$$\frac{4x}{2} = \frac{x+30}{4x}$$

$$16x^2 = 2x + 60$$

$$16x^2 - 2x - 60 = 0$$

$$8x^2 - x - 30 = 0$$

$$(x - 2)(8x + 15) = 0$$

$$x = 2 \quad \text{or} \quad x = -\frac{15}{8}$$

$$\underline{\hspace{1cm}} \quad 2 \quad \text{or} \quad -\frac{15}{8}$$

(4)

(b) Find the possible values of the 4th term of the geometric sequence.

if

$$x = 2 \quad \begin{matrix} \xrightarrow{\times 4} & \xrightarrow{\times 4} & \xrightarrow{\times 4} \\ 2, & 8, & 32, & 128 \end{matrix}$$

if $x = -\frac{15}{8}$

$$\begin{matrix} \xrightarrow{\times -3.75} & \xrightarrow{\times -3.75} \\ 2, & -7.5, & 28.125 \end{matrix}$$

$$\underline{\hspace{1cm}} \quad 128 \quad \text{or} \quad -\frac{3375}{32}$$

↓ (2)

$$(-105.46875)$$

45. Jensen and Bert each write down a fraction.



Jensen wrote down a fraction where the denominator is one more than twice the numerator.

$$\frac{x}{2x+1}$$

Both the numerator and denominator of Bert's fraction are three more than Jensen's.

$$\frac{x+3}{2x+4}$$

The sum of the two fractions is $\frac{37}{36}$

Find the difference between the fractions.

$$\frac{x}{2x+1} + \frac{x+3}{2x+4} = \frac{37}{36}$$

$$\frac{x(2x+4) + (x+3)(2x+1)}{(2x+1)(2x+4)} = \frac{37}{36}$$

$$\frac{2x^2 + 4x + 2x^2 + x + 6x + 3}{(2x+1)(2x+4)} = \frac{37}{36}$$

$$\frac{4x^2 + 11x + 3}{(2x+1)(2x+4)} \neq \frac{37}{36}$$

$$144x^2 + 396x + 108 = 37(4x^2 + 10x + 4)$$

$$144x^2 + 396x + 108 = 148x^2 + 370x + 148$$

$$4x^2 - 26x + 40 = 0$$

$$2x^2 - 13x + 20 = 0$$

$$(2x-5)(x-4) = 0$$

$$x = 2.5 \quad x = 4$$

x ✓

Jensen $\frac{4}{9}$

Bert $\frac{7}{12}$

$$\frac{7}{12} - \frac{4}{9}$$

$$\frac{21}{36} - \frac{16}{36}$$

$$= \frac{5}{36}$$

$$\frac{5}{36}$$

(6)