

## Solving Quadratic Equations - Worksheet

### Skill

#### Group A - Solving quadratic equations by factorising ( $a = 1$ )

Solve by factorising:

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

2)  $x^2 + 12x + 20 = 0$

3)  $x^2 + 21x + 20 = 0$

4)  $x^2 + 19x - 20 = 0$

5)  $x^2 - 21x + 20 = 0$

6)  $x^2 - 19x - 20 = 0$

7)  $x^2 - x - 20 = 0$

8)  $x^2 - 9x + 20 = 0$

9)  $x^2 - 12x + 20 = 0$

10)  $x^2 + 8x - 20 = 0$

11)  $x^2 - 8x - 20 = 0$

12)  $x^2 + x - 20 = 0$

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#### Group B - Solving quadratic equations by factorising ( $a > 1$ )

Solve by factorising:

1)  $2x^2 + 11x + 15 = 0$

2)  $2x^2 - 11x + 15 = 0$

3)  $2x^2 - x - 15 = 0$

4)  $2x^2 + x - 15 = 0$

5)  $3x^2 + 15x + 12 = 0$

6)  $3x^2 + 37x + 12 = 0$

7)  $3x^2 + 20x + 12 = 0$

8)  $3x^2 + 12x + 12 = 0$

9)  $3x^2 - 13x + 12 = 0$

10)  $5x^2 - 13x - 6 = 0$

11)  $5x^2 + 17x + 6 = 0$

12)  $5x^2 - x - 6 = 0$

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#### Group C - Solving quadratic equations by factorising ( $a > 1$ )

Solve by factorising:

1)  $6x^2 + 13x + 6 = 0$

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

3)  $8x^2 + 41x + 5 = 0$

4)  $6x^2 - 7x + 2 = 0$

5)  $9x^2 - 12x - 5 = 0$

6)  $8x^2 + 10x - 3 = 0$

7)  $6x^2 - 35x + 49 = 0$

8)  $9x^2 + 6x + 1 = 0$

9)  $8x^2 + 29x + 15 = 0$

10)  $6x^2 - 7x - 10 = 0$

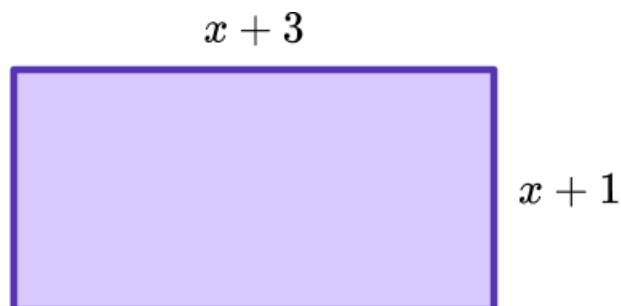
11)  $4x^2 - 3x = 0$

12)  $2x^2 - 5x = 0$

## Solving Quadratic Equations - Worksheet

### Applied

- 1) The area of the rectangle is  $15\text{cm}^2$ .



- (a) Form an equation for the area of this rectangle.  
(b) Determine the value of  $x$ .
- 2) (a) Spot and correct the mistakes.

**Factorise**

$$y^2 - 5y + 4$$

$$(y + 4)(y + 1)$$

- (b) Solve  $y^2 - 5y + 4 = 0$

- 3) (a) Spot and correct the mistakes.

**Factorise**

$$2x^2 + 9x + 10$$

$$(2x + 2)(x + 5)$$

- (b) Solve  $2x^2 + 9x + 10 = 0$

- 4) Solve the following equation:  $8x^2 + 6x + 12 = 5x^2 - 4x + 20$

## Solving Quadratic Equations - Exam Questions

1) (a) Factorise  $x^2 + x - 42$ .

.....  
(2)

(b) Hence solve  $x^2 + x - 42 = 0$ .

.....  
(2)  
(4 marks)

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2) Solve  $p^2 + 9p + 14 = 0$

.....  
(2 marks)

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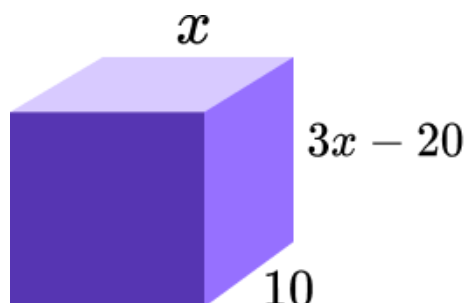
3) Solve  $h^2 + 9h + 2 = 8h + 58$

.....  
(3 marks)

## Solving Quadratic Equations - Exam Questions

4) Below is a cuboid.

The volume of the cuboid is  $1000\text{cm}^3$



(a) Show that  $3x^2 - 20x - 100 = 0$ .

.....  
(3)

(b) Solve  $3x^2 - 20x - 100 = 0$ . To find  $x$ , the length of the cuboid.

.....  
(3)  
(6 marks)


# Solving Quadratic Equations - Answers

	Question	Answer
	Skill Questions	
Group A	Solve by factorising:  1) $x^2 + 9x + 20 = 0$ 2) $x^2 + 12x + 20 = 0$ 3) $x^2 + 21x + 20 = 0$ 4) $x^2 + 19x - 20 = 0$ 5) $x^2 - 21x + 20 = 0$ 6) $x^2 - 19x - 20 = 0$ 7) $x^2 - x - 20 = 0$ 8) $x^2 - 9x + 20 = 0$ 9) $x^2 - 12x + 20 = 0$ 10) $x^2 + 8x - 20 = 0$ 11) $x^2 - 8x - 20 = 0$ 12) $x^2 + x - 20 = 0$	1) $x = -4, x = -5$ 2) $x = -2, x = -10$ 3) $x = -1, x = -20$ 4) $x = 1, x = -20$ 5) $x = 20, x = 1$ 6) $x = 20, x = -1$ 7) $x = -4, x = 5$ 8) $x = 4, x = 5$ 9) $x = 10, x = 2$ 10) $x = -10, x = 2$ 11) $x = -2, x = 10$ 12) $x = 4, x = -5$
Group B	Solve by factorising:  1) $2x^2 + 11x + 15 = 0$ 2) $2x^2 - 11x + 15 = 0$ 3) $2x^2 - x - 15 = 0$ 4) $2x^2 + x - 15 = 0$ 5) $3x^2 + 15x + 12 = 0$ 6) $3x^2 + 37x + 12 = 0$ 7) $3x^2 + 20x + 12 = 0$	1) $x = -\frac{5}{2}, x = -3$ 2) $x = \frac{5}{2}, x = 3$ 3) $x = -\frac{5}{2}, x = 3$ 4) $x = \frac{5}{2}, x = -3$ 5) $x = -4, x = -1$ 6) $x = -\frac{1}{3}, x = -12$ 7) $x = -\frac{2}{3}, x = -6$


## Solving Quadratic Equations - Answers

Group B contd	<b>8)</b> $3x^2 + 12x + 12 = 0$ <b>9)</b> $3x^2 - 13x + 12 = 0$ <b>10)</b> $5x^2 - 13x - 6 = 0$ <b>11)</b> $5x^2 + 17x + 6 = 0$ <b>12)</b> $5x^2 - x - 6 = 0$	<b>8)</b> $x = -2$ (repeated root) <b>9)</b> $x = \frac{4}{3}, x = 3$ <b>10)</b> $x = -\frac{2}{5}, x = 3$ <b>11)</b> $x = -\frac{2}{5}, x = -3$ <b>12)</b> $x = \frac{6}{5}, x = -1$
Group C	Solve by factorising: <b>1)</b> $6x^2 + 13x + 6 = 0$ <b>2)</b> $9x^2 + 9x + 2 = 0$ <b>3)</b> $8x^2 + 41x + 5 = 0$ <b>4)</b> $6x^2 - 7x + 2 = 0$ <b>5)</b> $9x^2 - 12x - 5 = 0$ <b>6)</b> $8x^2 + 10x - 3 = 0$ <b>7)</b> $6x^2 - 35x + 49 = 0$ <b>8)</b> $9x^2 + 6x + 1 = 0$ <b>9)</b> $8x^2 + 29x + 15 = 0$ <b>10)</b> $6x^2 - 7x - 10 = 0$ <b>11)</b> $4x^2 - 3x = 0$ <b>12)</b> $2x^2 - 5x = 0$	<b>1)</b> $x = -\frac{2}{3}, x = -\frac{3}{2}$ <b>2)</b> $x = -\frac{1}{3}, x = -\frac{2}{3}$ <b>3)</b> $x = -\frac{1}{8}, x = -5$ <b>4)</b> $x = \frac{2}{3}, x = \frac{1}{2}$ <b>5)</b> $x = \frac{5}{3}, x = -\frac{1}{3}$ <b>6)</b> $x = \frac{1}{4}, x = -\frac{3}{2}$ <b>7)</b> $x = \frac{7}{2}, x = \frac{7}{3}$ <b>8)</b> $x = -\frac{1}{3}$ repeated root <b>9)</b> $x = -\frac{5}{8}, x = -3$ <b>10)</b> $x = -\frac{5}{6}, x = 2$ <b>11)</b> $x = \frac{3}{4}, x = 0$ <b>12)</b> $x = \frac{5}{2}, x = 0$

# Solving Quadratic Equations - Answers

	Question	Answer
	Applied Questions	
1)	<p>The area of the rectangle is <math>15\text{cm}^2</math>.</p> <div style="text-align: center;"> <math>x + 3</math>    <math>x + 1</math> </div> <p><b>a)</b> Form an equation for the area of this rectangle.</p> <p><b>b)</b> Determine the value of <math>x</math>.</p>	<p><b>a)</b> <math>(x + 3)(x + 1) = 15</math>  <math>x^2 + 4x + 3 = 15</math></p> <p><b>b)</b> <math>x^2 + 4x - 12 = 0</math>  <math>(x + 6)(x - 2) = 0</math>  <math>x = -6, x = 2</math>  <math>x = 2</math> is the only valid answer as <math>x = -6</math> would lead to negative lengths of the rectangle.</p>
2)	<p><b>a)</b> Spot and correct the mistakes.</p> <div style="text-align: center;"> <b>Factorise</b>  <math>y^2 - 5y + 4</math>  <math>(y + 4)(y + 1)</math> </div> <p><b>b)</b> Solve <math>y^2 - 5y + 4 = 0</math></p>	<p><b>a)</b> It should be <math>(y - 4)(y - 1)</math></p> <p><b>b)</b> <math>y = 4, y = 1</math></p>
3)	<p><b>a)</b> Spot and correct the mistakes.</p> <div style="text-align: center;"> <b>Factorise</b>  <math>2x^2 + 9x + 10</math>  <math>(2x + 2)(x + 5)</math> </div> <p><b>b)</b> Solve <math>2x^2 + 9x + 10 = 0</math></p>	<p><b>a)</b> It should be <math>(2x + 5)(x + 2)</math></p> <p><b>b)</b> <math>x = 2.5, x = -2</math></p>
4)	<p>Solve the following equation</p> $8x^2 + 6x + 12 = 5x^2 - 4x + 20$	$3x^2 + 10x - 8 = 0$ $(3x - 2)(x + 4) = 0$ $x = -4, x = \frac{2}{3}$

## Solving Quadratic Equations - Answers

	Question	Answer	
	Exam Questions		
1) (a)	Factorise $x^2 + x - 42$	(a) $(x \pm 6)(x \pm 7)$ $(x + 7)(x - 6)$	(1) (1)
(b)	Hence solve $x^2 + x - 42 = 0$	(b) $x = -7$ $x = 6$	(1) (1)
2)	Solve $p^2 + 9p + 14 = 0$	$(p + 2)(p + 7)$ $p = -2, p = -7$	(1) (1)
3)	Solve $h^2 + 9h + 2 = 8h + 58$	$h^2 + h - 56 = 0$ $(h - 8)(h + 7)$ $h = 8, h = -7$	(1) (1) (1)
4)	Below is a cuboid. The volume of the cuboid is $1000\text{cm}^3$ .  <div style="text-align: center;">  </div>		
(a)	Show that $3x^2 - 20x - 100 = 0$	(a) $10x(3x - 20) = 1000$ $30x^2 - 200x - 1000 = 0$ $3x^2 - 20x - 100 = 0$	(1) (1) (1)
(b)	Solve $3x^2 - 20x - 100 = 0$ . To find $x$ , the length of the cuboid.	(b) $(3x \pm 10)(3x \pm 10) = 0$ $(3x + 10)(3x - 10) = 0$ $x = 10$  Note: $x = -10$ is not a reasonable solution for a dimension.	(1) (1) (1)

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