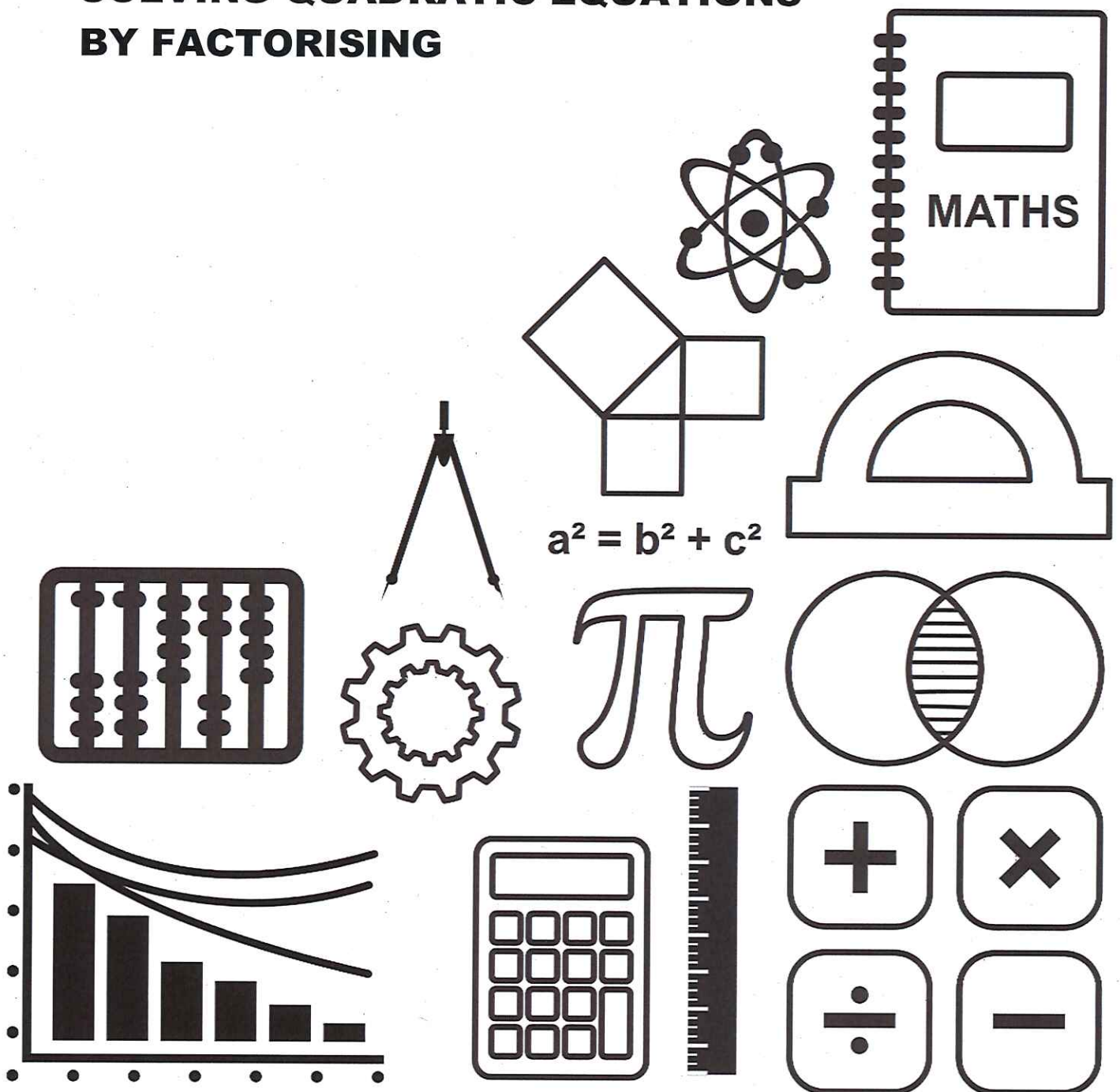


GCSE TOPIC BOOKLET
SOLVING QUADRATIC EQUATIONS
BY FACTORISING

SOLUTIONS



1. Solve

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

$$x+2=0 \quad \text{and} \quad 5x-1=0$$

$$\underline{x = -2}$$

$$5x = 1$$

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

[2]

2.

Factorise the expression $x^2 - 9x - 10$ and hence solve the equation $x^2 - 9x - 10 = 0$.

$$(x-10)(x+1)=0$$

$$x-10=0 \quad \text{and} \quad x+1=0$$

$$\underline{x = 10}$$

$$\underline{x = -1}$$

[3]

3. Factorise the expression $10x^2 + 21x - 10$ and hence solve the equation $10x^2 + 21x - 10 = 0$.

$$a=10$$

$$b=21$$

$$c=-10$$

$\begin{matrix} x \\ a \\ -100 \end{matrix}$	$\begin{matrix} + \\ b \\ 21 \end{matrix}$
--	--

rewrite as

$$\underline{-4, 25}$$

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

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

$$= \underline{(5x-2)(2x+5)}$$

Now solve, $(5x-2)(2x+5)=0$

$$(5x-2)=0 \quad \text{and} \quad (2x+5)=0$$

$$5x = 2$$

$$2x = -5$$

$$\underline{x = \frac{2}{5}}$$

$$\underline{x = -\frac{5}{2}}$$

$$\underline{(-2.5)}$$

[3]

4. Factorise the expression $x^2 - 5x + 6$ and hence solve the equation $x^2 - 5x + 6 = 0$.

$$(x-3)(x-2)$$

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

$$x-3=0 \quad \text{and} \quad x-2=0$$

$$x=3$$

$$x=2$$

[3]

5. Factorise the expression $8x^2 - 26x - 7$ and hence solve the equation $8x^2 - 26x - 7 = 0$.

$$a=8 \quad b=-26 \quad c=-7$$

$$\begin{array}{r|l} x & b^+ \\ \hline ax & -56 \end{array} \quad -26$$

rewrite as

$$8x^2 + 2x - 28x - 7$$

$$-28, 2$$

$$= 2x(4x+1) - 7(4x+1)$$

$$= (2x-7)(4x+1)$$

Now solve, $(2x-7)(4x+1) = 0$

$$(2x-7)=0 \quad \text{and} \quad (4x+1)=0$$

$$2x=7$$

$$4x=-1$$

$$x = \frac{7}{2} \quad (3.5)$$

$$x = -\frac{1}{4} \quad (-0.25) \quad [3]$$

6. Factorise the expression $6x^2 + 11x + 3$ and hence solve the equation $6x^2 + 11x + 3 = 0$.

$$a=6 \quad b=11 \quad c=3$$

$$\begin{array}{r|l} x & b^+ \\ \hline ax & 18 \end{array} \quad 11$$

rewrite as

$$6x^2 + 9x + 2x + 3$$

$$9, 2$$

$$= 3x(2x+3) + 1(2x+3)$$

$$= (3x+1)(2x+3)$$

Now solve, $(3x+1)(2x+3) = 0$

$$3x+1=0 \quad \text{and} \quad 2x+3=0$$

$$3x=-1$$

$$2x=-3$$

$$x = -\frac{1}{3}$$

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

$$x = -1.5$$

[3]

7. Factorise $3x^2 + 10x - 8$ and hence solve the equation $3x^2 + 10x - 8 = 0$.

$$a=3 \quad b=10 \quad c=-8$$

$\times ac$	$+b$
-24	10

Rewrite as $3x^2 + 12x - 2x - 8$

$$12, -2$$

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

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

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

$$x+4=0 \quad \text{and} \quad 3x-2=0$$

$$x = -4$$

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

[3]

8. Factorise the expression $10t^2 + 11t + 3$ and hence solve the equation $10t^2 + 11t + 3 = 0$.

$$a=10 \quad b=11 \quad c=3$$

$\times ac$	$+b$
30	11

$$6, 5$$

Rewrite as $10t^2 + 5t + 6t + 3$

$$= 5t(2t+1) + 3(2t+1)$$

$$= (2t+1)(5t+3)$$

Now solve, $(2t+1)(5t+3) = 0$

$$2t+1=0 \quad \text{and} \quad 5t+3=0$$

$$2t = -1$$

$$5t = -3$$

$$t = -\frac{1}{2} \quad (-0.5)$$

$$t = -\frac{3}{5} \quad (-0.6) \quad [3]$$

9. Factorise the expression $15x^2 + 19x + 6$, and hence solve the equation $15x^2 + 19x + 6 = 0$.

$$a=15 \quad b=19 \quad c=6$$

$\times ac$	$+b$
90	19

$$9, 10$$

Rewrite as $15x^2 + 10x + 9x + 6$

$$= 5x(3x+2) + 3(3x+2)$$

$$= (3x+2)(5x+3)$$

Now solve, $(3x+2)(5x+3) = 0$

$$3x+2=0 \quad \text{and} \quad 5x+3=0$$

$$3x = -2$$

$$5x = -3$$

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

$$x = -\frac{3}{5} \quad (-0.6) \quad [3]$$

10. Factorise the expression $14w^2 + 23w + 3$ and hence solve the equation $14w^2 + 23w + 3 = 0$.

$a=14$ $b=23$ $c=3$

ac	$+b$
42	23

21, 2

Rewrite as $14w^2 + 21w + 2w + 3$

$= 7w(2w + 3) + 1(2w + 3)$

$= (2w + 3)(7w + 1)$

Now solve, $(2w + 3)(7w + 1) = 0$

$2w + 3 = 0$ and $7w + 1 = 0$

$2w = -3$

$7w = -1$

$w = -1.5$

$w = -\frac{1}{7}$

[3]

11. Factorise the expression $12x^2 + 11x - 15$ and hence solve the equation $12x^2 + 11x - 15 = 0$.

$a=12$ $b=11$ $c=-15$

ac	$+b$
-180	11

20, -9

Rewrite as $12x^2 + 20x - 9x - 15$

$= 4x(3x + 5) - 3(3x + 5)$

$= (3x + 5)(4x - 3)$

Now solve, $(3x + 5)(4x - 3) = 0$

$3x + 5 = 0$ and $4x - 3 = 0$

$3x = -5$

$4x = 3$

$x = -\frac{5}{3}$

$(-\frac{2}{3})$

$x = \frac{3}{4}$

(0.75)

[3]