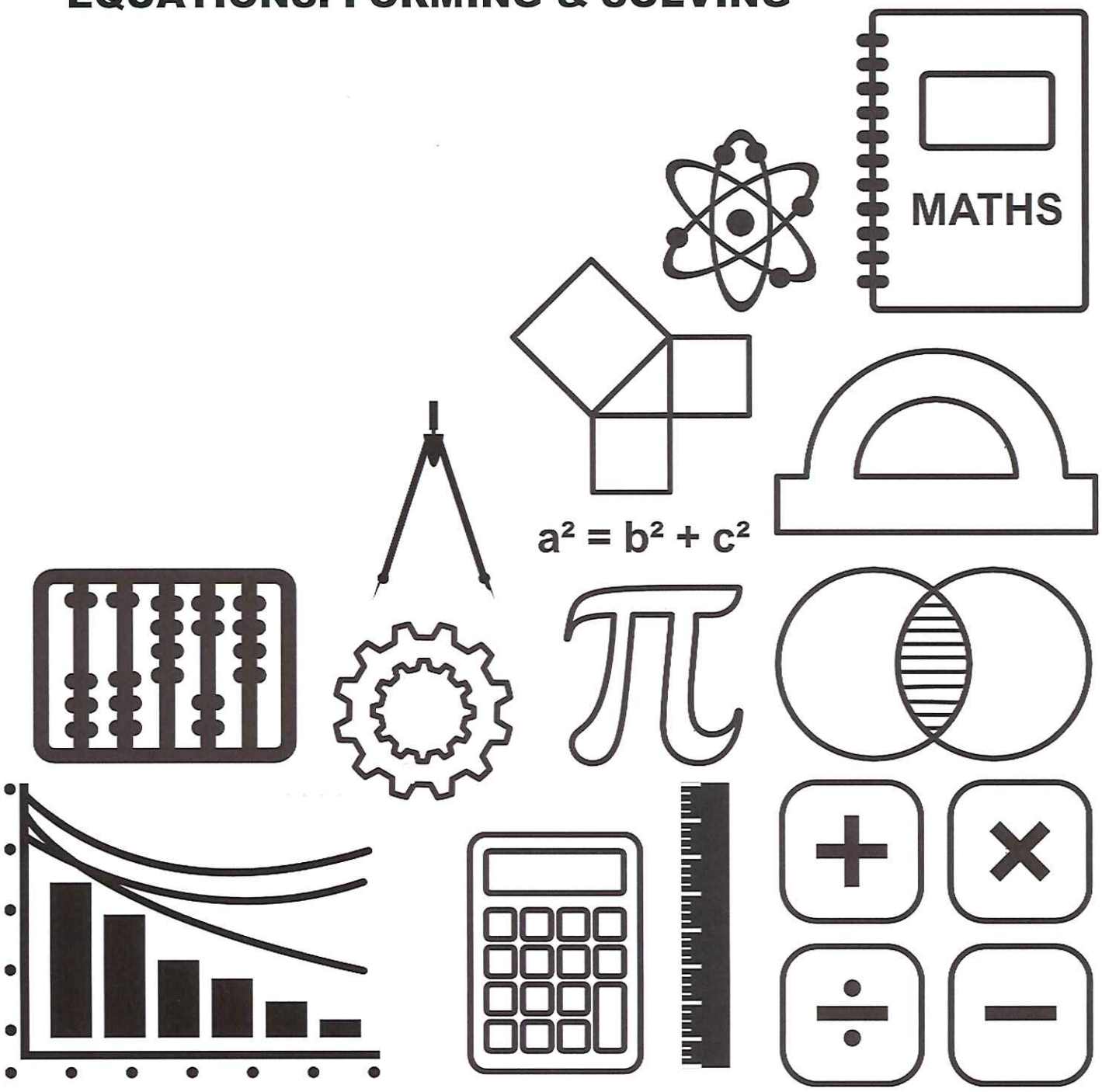
MATHSDIY

SOLUTIONS

GCSE TOPIC BOOKLET
EQUATIONS: FORMING & SOLVING



1.

In this table, the letters a, b c and d represent different numbers.
The total for each row is given at the side of the table.
Find the values of a, b, c and d.

①	a	a	a	a	12
②	b	b	a	a	18
③	c	b	b	a	22
④	d	c	b	a	21

① $4a = 12$, $a = 3$

② $2b + 2a = 18$

$2b + 6 = 18$

$2b = 12$

$b = 6$

③ $c + 2b + a = 22$

$c + 12 + 3 = 22$

$c + 15 = 22$, $c = 7$

④ $d + c + b + a = 21$

$d + 7 + 6 + 3 = 21$, $d + 16 = 21$

$d = 5$

$a = 3$ $b = 6$ $c = 7$ $d = 5$

[4]

2. Look at the grid.
The total of each column is shown under the grid.

①	②	③	④
a	b	c	a
a	c	c	b
b	c	c	c
b	c	c	d
10	26	32	0

Find the values of a, b, c and d.

③ $4c = 32$
$c = 8$

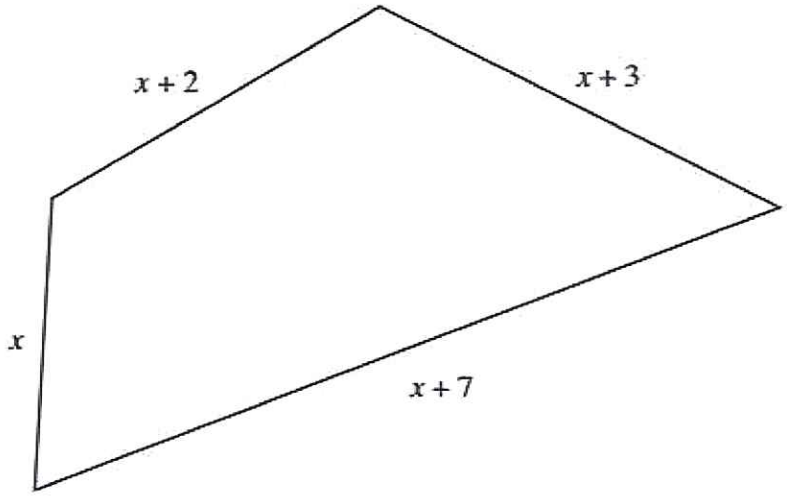
② $b + 3c = 26$
$b + 24 = 26$
$b = 2$

① $2a + 2b = 10$
$2a + 4 = 10$
$2a = 6$
$a = 3$

④ $a + b + c + d = 0$
$3 + 2 + 8 + d = 0$
$13 + d = 0$
$d = -13$

$a =$ 3 $b =$ 2 $c =$ 8 $d =$ −13 [4]

3. The diagram shows a quadrilateral.
The lengths of the sides are all given in centimetres.



(a) Write an expression for the perimeter of the quadrilateral in terms of x.

$x+2+x+3+x+7+x$

or $4x+12$

[1]

(b) (i) The perimeter of the quadrilateral is 40 cm.
Write down an equation in terms of x.

$4x+12=40$

(ii) Solve the equation.

$4x = 40-12.$

$4x = 28$

$x = 28/4$

$x = 7$cm.

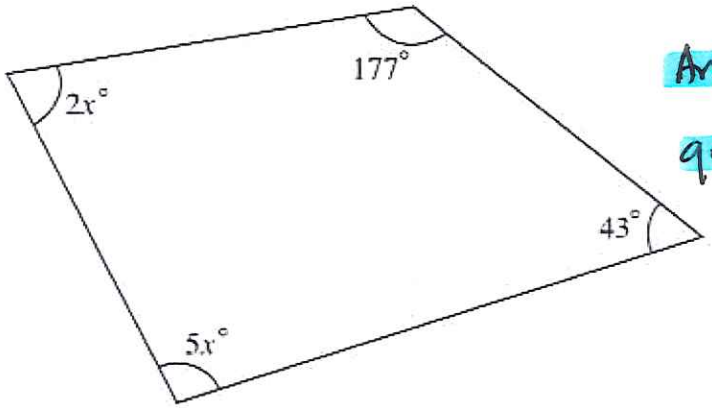
[2]

(c) Write down the lengths of the four sides of the quadrilateral.

7cm , 9cm , 10cm , 14cm

[1]

4.



Angles in a quadrilateral total 360°

Diagram not drawn to scale.

The diagram shows a quadrilateral with interior angles of $2x°$, $5x°$, $43°$ and $177°$. Write down an equation in terms of x. Solve your equation to find the value of x. Hence write down the size of the smallest angle in the quadrilateral.

$2x + 177^\circ + 5x + 43^\circ = 360^\circ$

$7x + 220^\circ = 360^\circ$

$7x = 360^\circ - 220^\circ$

$7x = 140^\circ$

$x = 20^\circ$

Smallest angle $= 2x = 40^\circ$

[5]

5. In the following table, the letters **a**, **b**, **c** and **d** represent different numbers.
The total for each row is given at the side of the table.
Find the values of **a**, **b**, **c** and **d**.

(1)	a	a	a	a	20
(2)	a	a	a	b	17
(3)	b	b	c	c	12
(4)	a	b	c	d	18

(1) $4a = 20$ $a = 5$

(2) $3a + b = 17$ $15 + b = 17$ $b = 2$

(3) $2b + 2c = 12$ $4 + 2c = 12$ $2c = 8$ $c = 4$

(4) $a + b + c + d = 18$ $5 + 2 + 4 + d = 18$ $11 + d = 18$ $d = 7$

a = 5 b = 2 c = 4 d = 7

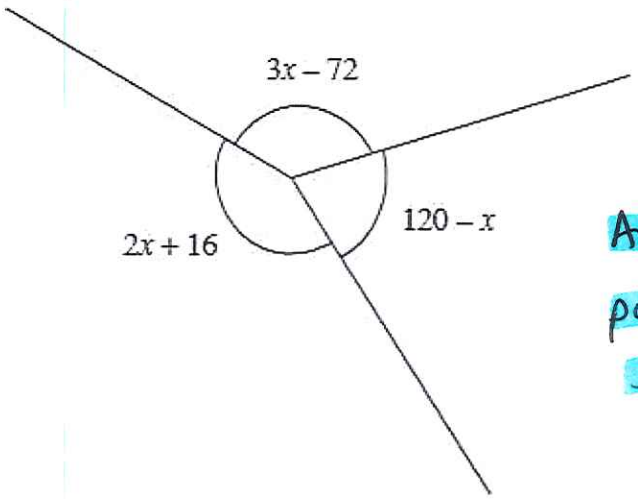
[4]

6. Complete the table.

$3x$	33
x	11
$2c - 3$	17
c	10
$c - a$	3
a	7
$a + b$	12
b	5
$c + b$	15

[4]

7. In the diagram below, three lines meet at a point. The sizes of the angles between the lines, measured in degrees, are as shown in the diagram.



Angles at a point total 360°.

(a) Write down an equation that x satisfies.

$3x - 72 + 2x + 16 + 120 - x = 360$

or $4x + 64 = 360$

[2]

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

$4x = 360 - 64$

$4x = 296$

$x = 296 \div 4$

$x = 74°$

[2]

8. In this table, the letters a, b and c represent different numbers.
The total for each row is given at the side of the table.
Find the values of a, b and c.

①	a	a	a	a	20
②	b	a	a	a	18
③	c	c	a	a	22

① $4a = 20$
$a = 20/4$
$a = 5$

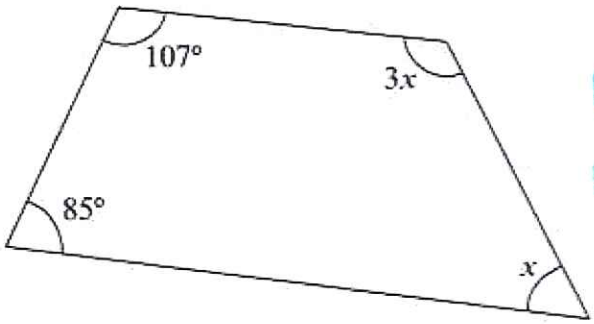
② $b + 3a = 18$
$b + 15 = 18$
$b = 3$

③ $2c + 2a = 22$
$2c + 10 = 22$
$2c = 12$
$c = 6$

$a = 5$ $b = 3$ $c = 6$

[3]

9.



Angles in a quadrilateral add upto 360°.

Diagram not drawn to scale

The interior angles of a quadrilateral are $x°$, 85°, 107° and $3x°$.
Form an equation and solve it to find the value of x.

$107 + 3x + x + 85 = 360$

$4x + 192 = 360$

$4x = 360 - 192$

$4x = 168$

$x = 168 \div 4$

$x = 42°$

[4]