

AQA Level 2 Certificate

FURTHER MATHEMATICS

Level 2 (8360)

Worksheet 12

Algebraic Problems – including ratio

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12 Algebraic Problems - including ratio

Note

- If $x : y = 4 : 7$, then $\frac{x}{y} = \frac{4}{7}$
- If, in a problem, two numbers are in the ratio $4 : 7$, use $4x$ and $7x$ as the numbers (usually leading to a linear equation); otherwise, use x and y as the numbers (which will lead to simultaneous equations).
- If $x : y = 4 : 7$, what is $x + 2y : 3x$?

Think in terms of 'parts', ie 4 parts and 7 parts, so $x + 2y : 3x = 4 + 14 : 12$

$$= 18 : 12$$

$$= 3 : 2$$

Question 1

Work out the possible values of $\frac{2n - 1}{3n + 2}$ if $n^2 = 16$

Give your answers as fractions in their simplest form.

(4 marks)

Question 2

$x : y = 6 : 5$

(a) Express x in terms of y .

(2 marks)

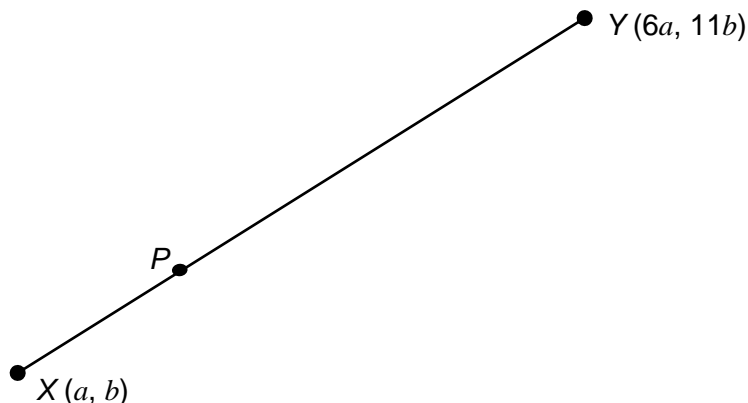
(b) Show that $x + 3y : 2x - y = 3 : 1$

(2 marks)

Question 3

A point P divides XY in the ratio $3 : 7$

Not drawn accurately



Work out the coordinates of P , in terms of a and b .

(3 marks)

Question 4

Here is a linear sequence

$$a + b \quad a + 3b \quad a + 5b \quad a + 7b \quad \dots\dots$$

Given that

- 2nd term : 4th term = $2 : 5$
- 1st term = -4

Work out a and b .

(5 marks)

Question 5

You are given that $ab + a = 5$ and $a : b = 4 : 3$

Work out the possible pairs of values of a and b .

(7 marks)

Question 6

The sum of the ages of two people is 90 years.

Six years ago, their ages were in the ratio $8 : 5$

How old are they now?

Do **not** use trial and improvement.

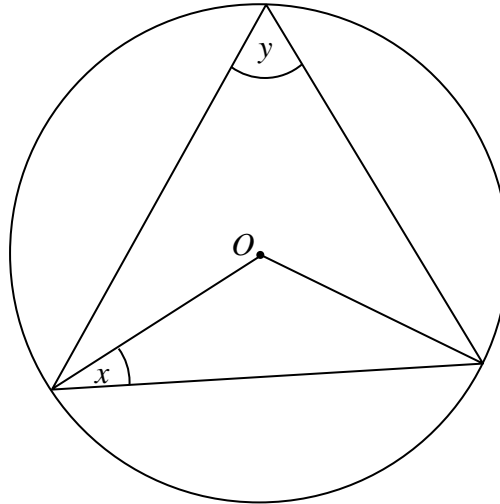
You **must** show your working.

(5 marks)

Question 7

O is the centre of the circle.

Not drawn accurately



Given that $x : y = 4 : 5$

Work out the value of y .

Do **not** use trial and improvement.

You **must** show your working.

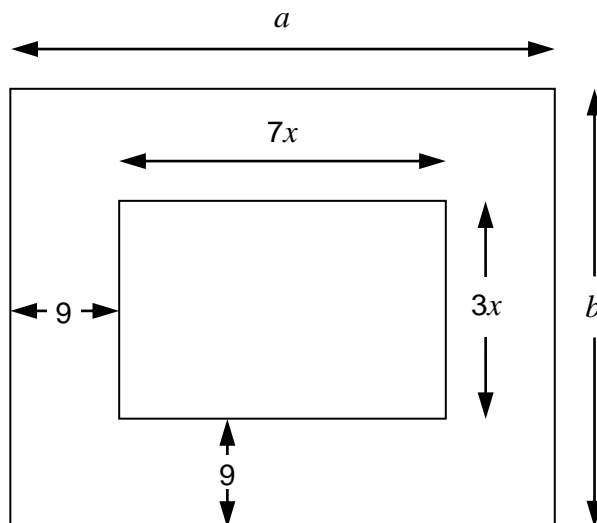
(7 marks)

Question 8

A rectangular picture is surrounded by a frame of constant width.

All measurements are in centimetres.

Not drawn accurately



Given that $a : b = 3 : 2$

Work out x .

(5 marks)

Question 9

If $x : y = 3 : 5$ and $y : z = 10 : 9$

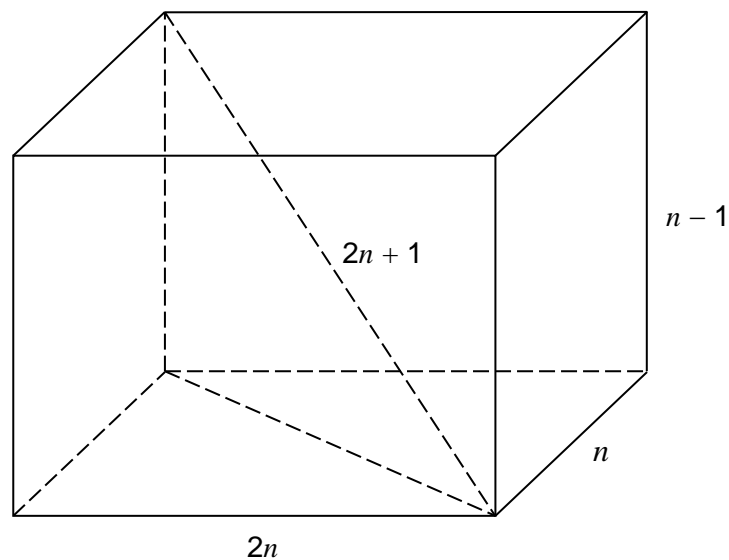
Find, in its simplest form

- (a) $x : z$ (3 marks)
- (b) $10x : 7y$ (2 marks)
- (c) $x + y : y$ (2 marks)

Question 10

A cuboid has dimensions $2n$, n and $n - 1$ cm.

A diagonal has length $2n + 1$ cm.



Work out n .

(6 marks)