

1MA1 Higher themed papers: Ratio and proportion

Write your name here			
Surname	Other names		
Centre Number		Candidate Number	
Pearson Edexcel Level 1/Level 2 GCSE (9–1)			
Mathematics Ratio and proportion			
		Paper Reference 1MA1	
You must have: Ruler graduated in centimetres and millimetres, protractor, pair of compasses, pen, HB pencil, eraser, calculator. Tracing paper may be used.			Total Marks

Instructions

- Use **black** ink or ball-point pen.
- **Fill in the boxes** at the top of this page with your name, centre number and candidate number.
- Answer **all** questions.
- Answer the questions in the spaces provided – *there may be more space than you need.*
- You must **show all your working.**
- Diagrams are **NOT** accurately drawn, unless otherwise indicated.
- If your calculator does not have a π button, take the value of π to be 3.142 unless the question instructs otherwise.

Information

- The total mark for this paper is **94**. There are **24** questions.
- Questions have been arranged in an ascending order of mean difficulty, as found by all students in the June 2017–November 2019 examinations.
- The marks for **each** question are shown in brackets – *use this as a guide as to how much time to spend on each question.*

Advice

- Read each question carefully before you start to answer it.
- Keep an eye on the time.
- Try to answer every question.
- Check your answers if you have time at the end.

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1 Deon needs 50 g of sugar to make 15 biscuits.

She also needs

three times as much flour as sugar

two times as much butter as sugar

Deon is going to make 60 biscuits.

(a) Work out the amount of flour she needs.

..... g
(3)

Deon has to buy all the butter she needs to make 60 biscuits.

She buys the butter in 250 g packs.

(b) How many packs of butter does Deon need to buy?

.....
(2)

(Total for Question 1 is 5 marks)

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2 Daniel bakes 420 cakes.
He bakes only vanilla cakes, banana cakes, lemon cakes and chocolate cakes.

$\frac{2}{7}$ of the cakes are vanilla cakes.

35% of the cakes are banana cakes.

The ratio of the number of lemon cakes to the number of chocolate cakes is 4:5

Work out the number of lemon cakes Daniel bakes.

.....
(Total for Question 2 is 5 marks)

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- 3** £360 is shared between Abby, Ben, Chloe and Denesh.
The ratio of the amount Abby gets to the amount Ben gets is 2 : 7
Chloe and Denesh each get 1.5 times the amount Abby gets.
Work out the amount of money that Ben gets.

£.....
(Total for Question 3 is 4 marks)

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4

In a village

the number of houses and the number of flats are in the ratio 7 : 4

the number of flats and the number of bungalows are in the ratio 8 : 5

There are 50 bungalows in the village.

How many houses are there in the village?

.....
(Total for Question 4 is 3 marks)

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5

There are 60 people in a choir.
Half of the people in the choir are women.

The number of women in the choir is 3 times the number of men in the choir.
The rest of the people in the choir are children.

the number of children in the choir : the number of men in the choir = $n : 1$

Work out the value of n .
You must show how you get your answer.

$n = \dots\dots\dots$

(Total for Question 5 is 4 marks)

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- 6** Tom and Adam have a total of 240 stamps.
The ratio of the number of Tom's stamps to the number of Adam's stamps is 3 : 7
Tom buys some stamps from Adam.
The ratio of the number of Tom's stamps to the number of Adam's stamps is now 3 : 5
How many stamps does Tom buy from Adam?
You must show all your working.

.....
(Total for Question 6 is 4 marks)

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- 7 On Saturday, some adults and some children were in a theatre.
The ratio of the number of adults to the number of children was 5 : 2
- Each person had a seat in the Circle or had a seat in the Stalls.
- $\frac{3}{4}$ of the children had seats in the Stalls.
- 117 children had seats in the Circle.
- There are exactly 2600 seats in the theatre.
- On this Saturday, were there people on more than 60% of the seats?
You must show how you get your answer.

(Total for Question 7 is 5 marks)

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8 A shop sells packs of black pens, packs of red pens and packs of green pens.

There are

2 pens in each pack of black pens

5 pens in each pack of red pens

6 pens in each pack of green pens

On Monday,

$$\begin{array}{l} \text{number of packs} \\ \text{of black pens sold} \end{array} : \begin{array}{l} \text{number of packs} \\ \text{of red pens sold} \end{array} : \begin{array}{l} \text{number of packs} \\ \text{of green pens sold} \end{array} = 7 : 3 : 4$$

A total of 212 pens were sold.

Work out the number of green pens sold.

.....
(Total for Question 8 is 4 marks)

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9 Robert makes 50 litres of green paint by mixing litres of yellow paint and litres of blue paint in the ratio 2 : 3

Yellow paint is sold in 5 litre tins.

Each tin of yellow paint costs £26

Blue paint is sold in 10 litre tins.

Each tin of blue paint costs £48

Robert sells all the green paint he makes in 10 litre tins.

He sells each tin of green paint for £66.96

Work out Robert's percentage profit on each tin of green paint he sells.

.....%

(Total for Question 9 is 5 marks)

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- 10** Kiaria is 7 years older than Jay.
Martha is twice as old as Kiaria.
The sum of their three ages is 77

Find the ratio of Jay's age to Kiaria's age to Martha's age.

.....
(Total for Question 10 is 4 marks)

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11 Liquid A and liquid B are mixed together in the ratio 2 : 13 by volume to make liquid C.

Liquid A has density 1.21 g/cm^3

Liquid B has density 1.02 g/cm^3

A cylindrical container is filled completely with liquid C.

The cylinder has radius 3 cm and height 25 cm.

Work out the mass of the liquid in the container.

Give your answer correct to 3 significant figures.

You must show all your working.

.....g

(Total for Question 11 is 4 marks)

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12 Given that

$$x^2 : (3x + 5) = 1 : 2$$

find the possible values of x .

.....
(Total for Question 12 is 4 marks)

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- 13** White shapes and black shapes are used in a game.
Some of the shapes are circles.
All the other shapes are squares.

The ratio of the number of white shapes to the number of black shapes is 3:7

The ratio of the number of white circles to the number of white squares is 4:5

The ratio of the number of black circles to the number of black squares is 2:5

Work out what fraction of all the shapes are circles.

.....
(Total for Question 13 is 4 marks)

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14 The points A , B , C and D lie in order on a straight line.

$$AB : BD = 1:5$$

$$AC : CD = 7:11$$

Work out $AB : BC : CD$

..... : :

(Total for Question 14 is 3 marks)

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15 It would take 120 minutes to fill a swimming pool using water from 5 taps.

(a) How many minutes will it take to fill the pool if only 3 of the taps are used?

..... minutes
(2)

(b) State one assumption you made in working out your answer to part (a).

.....
.....
(1)

(Total for Question 15 is 3 marks)

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- 16** There are some small cubes and some large cubes in a bag.
The cubes are red or the cubes are yellow.

The ratio of the number of small cubes to the number of large cubes is 4 : 7

The ratio of the number of red cubes to the number of yellow cubes is 3 : 5

- (a) Explain why the least possible number of cubes in the bag is 88

.....
.....
.....

(1)

All the small cubes are yellow.

- (b) Work out the least possible number of large yellow cubes in the bag.

.....
(3)
(Total for Question 16 is 4 marks)

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- 17 A group of people went to a restaurant.
Each person chose one starter and one main course.

starter	main course
soup	lasagne
prawns	curry

the number of people who chose soup : the number of people who chose prawns = 2 : 3

Of those who chose soup,

the number of people who chose lasagne : the number of people who chose curry = 5 : 3

Of those who chose prawns,

the number of people who chose lasagne : the number of people who chose curry = 1 : 5

What fraction of the people chose curry?

You must show how you get your answer.

.....
(Total for Question 17 is 4 marks)

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18 There are only blue pens, green pens and red pens in a box.

The ratio of the number of blue pens to the number of green pens is 2 : 5

The ratio of the number of green pens to the number of red pens is 4 : 1

There are less than 100 pens in the box.

What is the greatest possible number of red pens in the box?

.....
(Total for Question 18 is 3 marks)

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19 p and q are two numbers such that $p > q$

When you subtract 5 from p and subtract 5 from q the answers are in the ratio 5 : 1

When you add 20 to p and add 20 to q the answers are in the ratio 5 : 2

Find the ratio $p : q$

Give your answer in its simplest form.

.....
(Total for Question 19 is 5 marks)

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20 The ratio $(y + x) : (y - x)$ is equivalent to $k : 1$

Show that $y = \frac{x(k + 1)}{k - 1}$

(Total for Question 20 is 3 marks)

21 Given that $a : b = 8 : 5$ and $b : c = 3 : 4$

find the ratio $a : b : c$

Give your answer in its simplest form.

.....
(Total for Question 21 is 3 marks)

22 The densities of three metal alloys, A, B and C, are in the ratio

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13 : 15 : 21

1 m³ of alloy B has a mass of 8600 kg.

Work out the difference between the mass of 5 m³ of alloy A and 3 m³ of alloy C.
Give your answer correct to 3 significant figures.

..... kg

(Total for Question 22 is 5 marks)

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23 $a = \sqrt{7} + \sqrt{c}$ and $b = \sqrt{63} + \sqrt{d}$, where c and d are positive integers.

Given that $c : d = 1 : 9$

find, in its simplest form, the ratio $a : b$

.....
(Total for Question 23 is 3 marks)

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24 There are some flowers in a shop.

Each flower is either red or yellow.

Each flower is either a tulip or a rose.

For these flowers

number of tulips : number of roses = 6 : 5

number of red tulips : number of yellow tulips = 3 : 4

Work out the proportion of the flowers that are red tulips.

.....
(Total for Question 24 is 3 marks)

TOTAL MARKS FOR PAPER: 94