Chhetri Academy

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GCSE MATHS

Ratio, proportion and rates of change

Edexcel 1MA1 | Subtopic collection Topic 31

Ratio

Foundation tier

Past paper question booklet

71	2011-2025	Foundation
question groups	available papers	tier

Before you begin

1. Show working and use units where appropriate.
2. Use extra paper if you need more space.
3. Print at actual size (100%) for measurement questions.

Name _____ **Date** _____

Whole questions are retained for context; some parts cover other points. Legacy sources are labelled.

17 Ali, Ben and Candice share £300 in the ratio 2 : 3 : 5

How much money does Candice get?

£ .....

(Total for Question 17 is 2 marks)

Question 02

9 (a) Write $\frac{1}{4}$ as a decimal.

.....

(1)

(b) Write 0.8 as a percentage.

..... %

(1)

(c) Write the ratio 2 : 6 in its simplest form.

.....

(1)

(Total for Question 9 is 3 marks)

15 A pile of sand has a weight of 60 kg.
The sand is put into a small bag, a medium bag and a large bag in the ratio 2 : 3 : 7

Work out the weight of sand in each bag.

small bag ..... kg

medium bag ..... kg

large bag ..... kg

(Total for Question 15 is 3 marks)

9 There are 240 students at Walbridge school.
15% of these students are left-handed.

(a) Work out how many students are left-handed.

.....

(2)

$\frac{1}{3}$ of the 240 students are female.

(b) How many of the students are female?

.....

(1)

80 of the students walk to school.
60 of the students cycle to school.

(c) Write the ratio of the number of students who walk to school to the number of students who cycle to school.
Give your ratio in its simplest form.

.....

(2)

(Total for Question 9 is 5 marks)

22 Pat and Julie share some money in the ratio 2 : 5
Julie gets £45 more than Pat.

How much money did Pat get?

£.....

(Total for Question 22 is 3 marks)

***29** Talil is going to make some concrete mix.
He needs to mix cement, sand and gravel in the ratio 1 : 3 : 5 by weight.

Talil wants to make 180 kg of concrete mix.

Talil has

15 kg of cement
85 kg of sand
100 kg of gravel

Does Talil have enough cement, sand and gravel to make the concrete mix?

(Total for Question 29 is 4 marks)

23 5 schools sent some students to a conference.

One of the schools sent both boys and girls.
This school sent 16 boys.
The ratio of the number of boys it sent to the number of girls it sent was 1 : 2

The other 4 schools sent only girls.
Each of the 5 schools sent the same number of students.

Work out the total number of students sent to the conference by these 5 schools.

.....

(Total for Question 23 is 4 marks)

25 Colin, Dave and Emma share some money.

Colin gets $\frac{3}{10}$ of the money.

Emma and Dave share the rest of the money in the ratio 3 : 2

What is Dave's share of the money?

.....

(Total for Question 25 is 4 marks)

***24** Miss Phillips needs to decide when to have the school sports day.

The table shows the number of students who will be at the sports day on each of 4 days.
It also shows the number of teachers who can help on each of the 4 days.

	Tuesday	**Wednesday**	**Thursday**	**Friday**
Number of students	179	162	170	143
Number of teachers	15	13	14	12

For every 12 students at the sports day there must be at least 1 teacher to help.

On which of these days will there be enough teachers to help at the sports day?
You must show all your working.

(Total for Question 24 is 3 marks)

***13** 140 children will be at a school sports day.
Lily is going to give a cup of orange drink to each of the 140 children.
She is going to put 200 millilitres of orange drink in each cup.

The orange drink is made from orange squash and water.
The orange squash and water are mixed in the ratio 1 : 9 by volume.

Orange squash is sold in bottles containing 750 millilitres.

Work out how many bottles of orange squash Lily needs to buy.
You must show all your working.

(Total for Question 13 is 4 marks)

7 (a) Write the number 20 400 in words.

.....

(1)

(b) Work out 3×-7

.....

(1)

(c) Work out $3 \times (2 + 7)$

.....

(1)

(d) Find the value of 2^4

.....

(1)

Here is a list of numbers.

4 5 8 9 12

(e) From the list, write down the prime number.

.....

(1)

(f) Write the ratio 2 : 6 in its simplest form.

.....

(1)

(Total for Question 7 is 6 marks)

14 Ewen has 48 white tiles and 16 blue tiles.

(a) Write down the ratio of the number of white tiles to the number of blue tiles.
Give your ratio in its simplest form.

.....

(2)

The cost of each white tile was £2
The cost of each blue tile was £4

(b) Work out the ratio of the total cost of the white tiles to the total cost of the blue tiles.

.....

(2)

(Total for Question 14 is 4 marks)

19 Gary's motorbike uses petrol.

Gary needs to mix oil with the petrol.
He mixes oil and petrol in the ratio 1 : 14 by volume.

Gary is going to ride his motorbike 3000 miles.
Each 20 miles he rides uses 1 litre of the oil and petrol mixture.

A 500 m*l* bottle of oil costs £3.99

Work out the total cost of the bottles of oil Gary needs to buy.
(1 litre = 1000 m*l*)

You must show all your working.

£ .....

(Total for Question 19 is 4 marks)

21 There are only red counters and blue counters in a bag.
The ratio of the number of red counters to the number of blue counters is 4 : 6

(a) Write this ratio in its simplest form.

.....

(1)

A counter is to be taken at random from the bag.

(b) Write down the probability that the counter will be blue.

.....

(2)

(Total for Question 21 is 3 marks)

***18** Seeta is organising a concert to raise money for a school and for a hospital.

A total of $\frac{1}{20}$ of the money received from selling tickets will be spent on hiring a hall.

The rest of the money received from selling tickets will be given to the school and to the hospital in the ratio $2:3$

Seeta expects to sell 1000 tickets at £23.50 each.

Work out the amount of money that Seeta expects to give to the school and to the hospital.
You must show all your working.

(Total for Question 18 is 5 marks)

19 There are some red counters and some yellow counters in a bag in the ratio 1 : 5

(a) What fraction of the counters in the bag are red?

.....

(1)

There are 20 yellow counters in the bag.

(b) Work out the number of red counters in the bag.

.....

(2)

Janet puts some more red counters into the bag.
The ratio of the number of red counters to the number of yellow counters is now 1 : 2

(c) How many red counters does Janet put into the bag?

.....

(2)

(Total for Question 19 is 5 marks)

26 There are 165 counters in a bag.

Each counter is either black or white.
There are twice as many black counters as white counters in the bag.

Martine takes 40% of the black counters from the bag.

Work out the ratio of the number of black counters to the number of white counters now in the bag.
Give your ratio in its simplest form.

.....

(Total for Question 26 is 4 marks)

10 There are 20 red counters and 15 blue counters in a bag.

(a) Write down the ratio of the number of red counters to the number of blue counters. Give your ratio in its simplest form.

.....

(2)

There are only red counters and blue counters in the bag.
x red counters are taken from the bag.
y blue counters are taken from the bag.

(b) Write down an expression, in terms of x and y, for the total number of counters now in the bag.

.....

(2)

(Total for Question 10 is 4 marks)

17 A supermarket car park has 200 spaces.
10% of the spaces are for staff.

The other spaces are for disabled people, for parents and for other customers in the ratio 1 : 2 : 7

Paul is going to paint a sign for each of the spaces for staff, for disabled people and for parents.
He is **not** going to paint signs for the spaces for other customers.

Work out the total number of spaces Paul is going to paint a sign for.

.....

(Total for Question 17 is 4 marks)

22 Babajan makes breakfast cereal.
She mixes nuts, raisins and oats in the ratio 3 : 2 : 5 by weight.

On Monday, Babajan uses 60 grams of nuts.

(a) Work out the weight of raisins and the weight of oats she uses to make the breakfast cereal.

raisins ..... grams

oats ..... grams

(3)

On Tuesday, Babajan makes 300 grams of the breakfast cereal.

500 grams of nuts cost £8

(b) Work out the cost of the nuts used to make 300 grams of the breakfast cereal.

£ .....

(3)

(Total for Question 22 is 6 marks)

Question 21

June 2017 | 1MA1/1F | Original Q10

10 A farmer has 20 boxes of eggs.
There are 6 eggs in each box.

Write, as a ratio, the number of eggs in two boxes to the total number of eggs.
Give your answer in its simplest form.

.....

(Total for Question 10 is 2 marks)

18 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 18 is 5 marks)

Question 23

5 A path is made of white tiles and grey tiles.

$\frac{1}{4}$ of the tiles are white.

(a) Write down the ratio of white tiles to grey tiles.

.....

(1)

There is a total of 56 tiles.

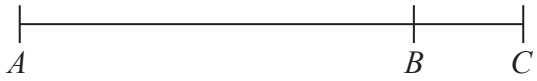
(b) Work out the number of grey tiles.

.....

(2)

(Total for Question 5 is 3 marks)

10 ABC is a straight line.



The length AB is five times the length BC.
$AC = 90$ cm.

Work out the length AB.

.....cm

(Total for Question 10 is 3 marks)

18 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 18 is 5 marks)

Question 26

15 There are only red buttons, yellow buttons and orange buttons in a jar.
The number of red buttons, the number of yellow buttons and the number of orange buttons are in the ratio 7 : 4 : 9

Work out what percentage of the buttons in the jar are orange.

..... %

(Total for Question 15 is 2 marks)

18 Harry, Regan and Kelan share £450 in the ratio 2 : 5 : 3

How much money does Kelan get?

£.....

(Total for Question 18 is 2 marks)

24 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 24 is 4 marks)

6 Annie and Lily share some money in the ratio 4 : 3

(a) What fraction of the money does Lily get?

.....

(1)

Rosie and Dan share some sweets.

Dan gets $\frac{1}{4}$ of the sweets.

(b) Write down the ratio of the number of sweets Rosie gets to the number of sweets Dan gets.

.....

(1)

(Total for Question 6 is 2 marks)

11 The table shows a cricket club's income in 2016 from a fete, a quiz and membership fees.

	Income	
Fete		£250
Quiz	Entry fees	13 at £5 each
	Refreshments	£35
Membership fees		25 at £20 each

Express as a ratio

the income from the fete to the income from the quiz to the income from membership fees.

Give your ratio in its simplest form.

.....

(Total for Question 11 is 3 marks)

15 The ratio of the cost of one metre of cotton fabric to the cost of one metre of silk fabric is 2 : 5

Complete the table of costs.

	2 m	**6 m**	**8 m**	**9 m**
cotton fabric	£6			
silk fabric				

(Total for Question 15 is 3 marks)

22 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 22 is 3 marks)

Question 33

17 There are some chocolates in a box.

$\frac{1}{4}$ of the chocolates contain nuts.

The rest of the chocolates do not contain nuts.

Write down the ratio of the number of chocolates that contain nuts to the number of chocolates that do not contain nuts.
Give your answer in the form 1 : n

.....

(Total for Question 17 is 2 marks)

20 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 20 is 3 marks)

23 Raya buys a van for £8500 plus VAT at 20%

Raya pays a deposit for the van.
She then pays the rest of the cost in 12 equal payments of £531.25 each month.

Find the ratio of the deposit Raya pays to the total of the 12 equal payments.
Give your answer in its simplest form.

.....

(Total for Question 23 is 5 marks)

16 Alan, Bispah and Chan share a sum of money.

Alan gets $\frac{1}{8}$ of the money.

Bispah gets $\frac{1}{2}$ of the money.

Chan gets the rest of the money.

Alan gets £2.50

(a) Work out how much money Bispah gets.

£.....

(2)

(b) Find the ratio

amount of money Alan gets : amount of money Chan gets

Give your answer in the form $a : b$ where a and b are whole numbers.

.....

(3)

(Total for Question 16 is 5 marks)

13 Azmol, Ryan and Kim each played a game.

Azmol's score was four times Ryan's score.
Kim's score was half of Azmol's score.

Write down the ratio of Azmol's score to Ryan's score to Kim's score.

.....

(Total for Question 13 is 2 marks)

15 Shahid is going to use these instructions to make a fizzy drink.

> Mix 5 parts of orange juice
> with 2 parts of lemonade

Shahid thinks that he has 300 m*l* of orange juice and 200 m*l* of lemonade.

(a) If Shahid is correct, what is the greatest amount of fizzy drink he can make?

..... m*l*

(3)

Shahid has 300 m*l* of orange juice but he only has 160 m*l* of lemonade.

(b) Does this affect the greatest amount of fizzy drink he can make?
Give a reason for your answer.

.....

.....

.....

(1)

(Total for Question 15 is 4 marks)

Question 39

November 2018 | 1MA1/3F | Original Q16

16 Write down the ratio of 450 grams to 15 grams.
Give your answer in its simplest form.

.....

(Total for Question 16 is 2 marks)

27 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,

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

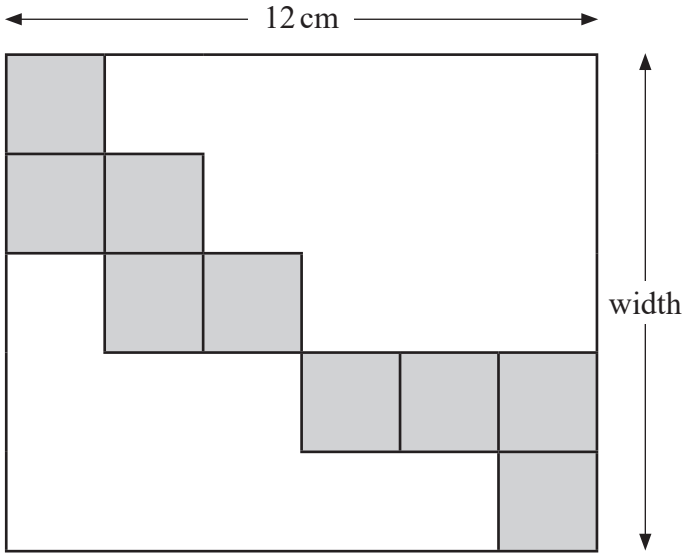
A total of 212 pens were sold.

Work out the number of green pens sold.

.....

(Total for Question 27 is 4 marks)

13 The diagram shows nine identical squares inside a rectangle.



The length of the rectangle is 12 cm.

Work out the width of the rectangle.

.....cm

(Total for Question 13 is 3 marks)

Question 42

June 2019 | 1MA1/2F | Original Q14

14 Write the ratio $4.5 : 2.25$ in the form $n : 1$

.....

(Total for Question 14 is 1 mark)

Question 43

26 £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 26 is 4 marks)

Question 44

June 2019 | 1MA1/3F | Original Q12

12 Ali, Ben and Cathy share an amount of money in the ratio 6 : 9 : 10

What fraction of the money does Ben get?

.....

(Total for Question 12 is 2 marks)

23 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

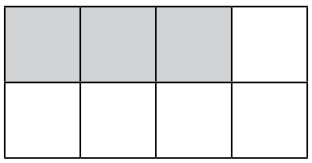
Tom buys some stamps from Adam.
The ratio of the number of Tom's stamps to the number of Adam's stamps is now 3 : 5

How many stamps does Tom buy from Adam?
You must show all your working.

.....

(Total for Question 23 is 4 marks)

6 Here is a grid of squares.



Write down the ratio of the number of shaded squares to the number of unshaded squares.

.....

(Total for Question 6 is 1 mark)

9 (a) A bag contains red counters and blue counters only.

number of red counters : number of blue counters = 3 : 4

Write down the fraction of the counters that are red.

.....

(1)

(b) Write the ratio 12 : 30 in the form 1 : n

.....

(2)

(Total for Question 9 is 3 marks)

Question 48

29 Given that $\frac{a}{b} = \frac{2}{5}$ and $\frac{b}{c} = \frac{3}{4}$

find $a : b : c$

.....

(Total for Question 29 is 3 marks)

17 Scott wants to make orange juice.
He is going to buy boxes of oranges.

There are 24 oranges in each box of oranges.
30 oranges make 2 litres of orange juice.

Scott needs to buy enough oranges to make 8 litres of orange juice.

(a) Work out the number of boxes of oranges that Scott needs to buy.
You must show all your working.

.....

(3)

Scott also buys
1260 apples
280 bananas

(b) Write down the ratio of the number of apples that Scott buys to the number of bananas that he buys.
Give your ratio in its simplest form.

.....

(2)

(Total for Question 17 is 5 marks)

20 Pens and pencils are sold in a shop.

12 pencils cost £1.80

The ratio of the cost of a pen to the cost of a pencil is 7 : 3

Work out the cost of 5 pens.

£.....

(Total for Question 20 is 4 marks)

12 There are two drama groups in a school.

In one group there are 36 boys and 48 girls.

In the other group, $\frac{3}{7}$ of the students are boys and the rest of the students are girls.

Ann says,

"The ratio of the number of boys to the number of girls is the same for both groups."

Is Ann correct?
You must show how you get your answer.

(Total for Question 12 is 3 marks)

24 Rosie, Matilda and Ibrahim collect stickers.

$$\text{number of stickers Rosie has} : \text{number of stickers Matilda has} : \text{number of stickers Ibrahim has} = 4:7:15$$

Ibrahim has 24 more stickers than Matilda.

Ibrahim has more stickers than Rosie.
How many more?

.....

(Total for Question 24 is 3 marks)

13 In the Northern hemisphere the ratio of the area of land to the area of water is 2 : 3

(a) Work out what percentage of the area of the Northern hemisphere is land.

.....%

(2)

20% of the area of the Southern hemisphere is land.

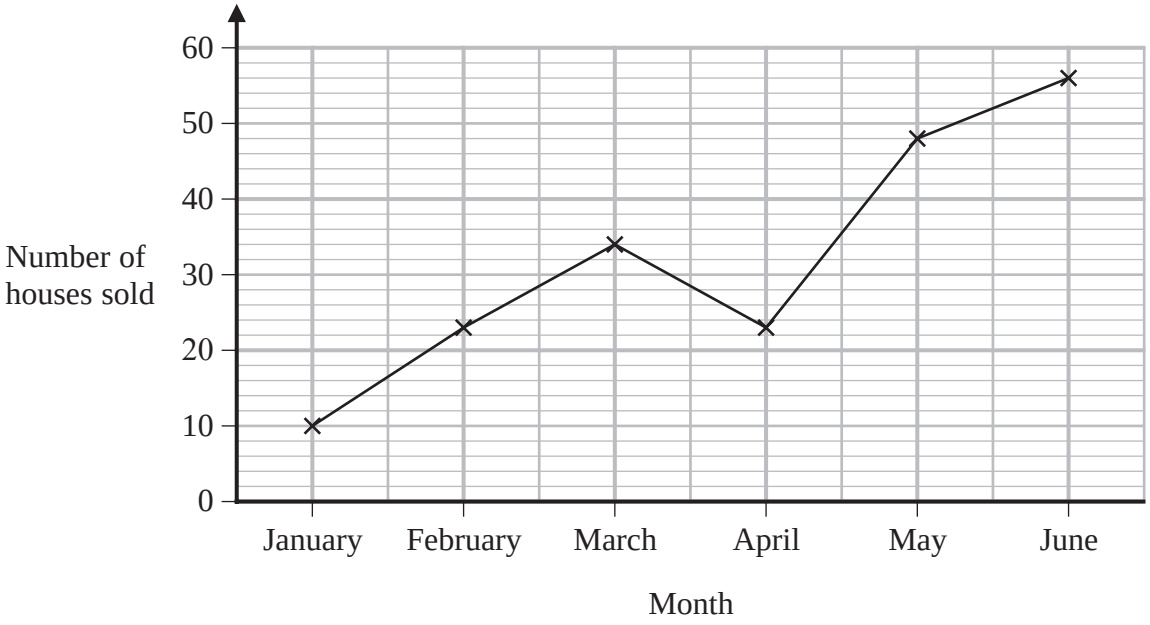
(b) Work out the ratio of the area of land to the area of water in the Southern hemisphere.

.....

(2)

(Total for Question 13 is 4 marks)

9 The graph shows information about the number of houses sold by an estate agent in each of six months last year.



(a) How many houses were sold by the estate agent in February?

.....

(1)

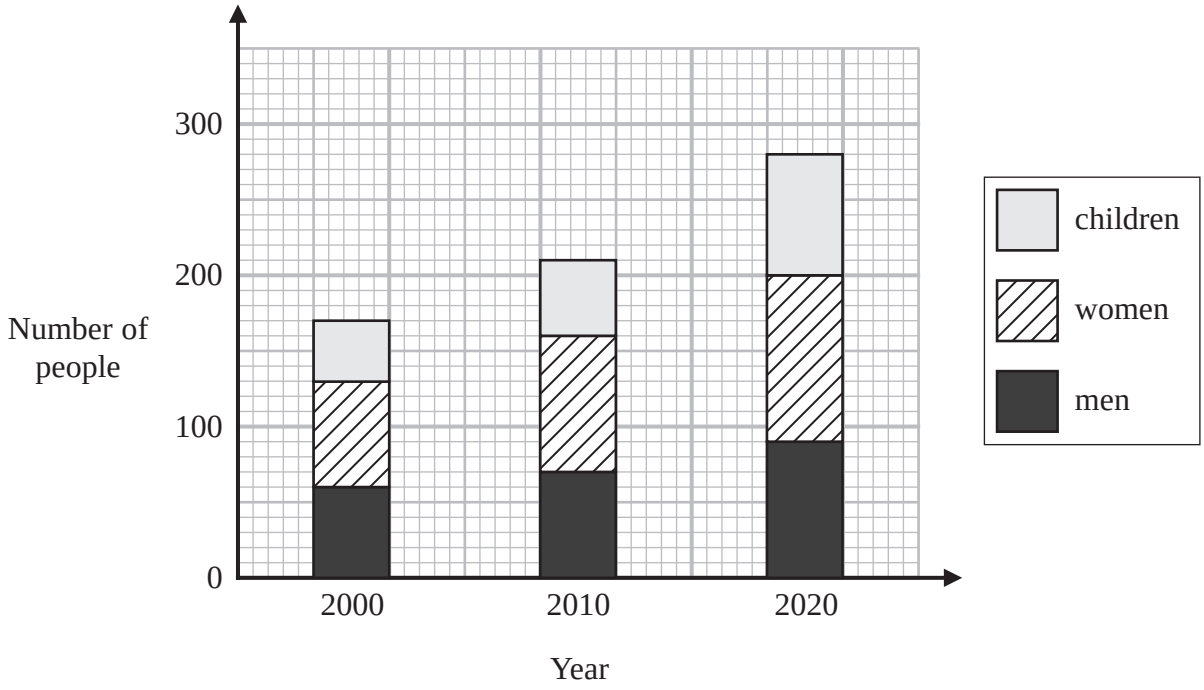
(b) For this estate agent, write down the ratio of the number of houses sold in January to the number of houses sold in June.

.....

(2)

(Total for Question 9 is 3 marks)

13 The composite bar chart shows information about the number of people living in a village.



(a) Write down the number of men living in the village in the year 2000

.....

(1)

(b) Find the number of children living in the village in the year 2010

.....

(1)

For the people living in the village in the year 2020

(c) find the ratio of the number of children to the **total** number of men and women.

.....

(2)

(Total for Question 13 is 4 marks)

17 There are only blue counters, green counters, red counters and yellow counters in a bag.

The table shows the number of blue counters in the bag.

Colour	blue	green	red	yellow
Number of counters	30			

There is a total of 100 counters in the bag.

Ashin takes at random a counter from the bag.

(a) Find the probability that the counter is **not** blue.

.....

(2)

The ratio of the number of blue counters to the number of green counters is 2 : 3

(b) Work out the number of green counters in the bag.

.....

(2)

Bradley says,

"The number of red counters in the bag is the same as the number of yellow counters in the bag."

(c) Can Bradley be correct?
Give a reason for your answer.

.....

.....

.....

(1)

(Total for Question 17 is 5 marks)

12 Amol, Gemma and Harry each have a number of sweets.

The number of sweets that Gemma has is 6 times the number of sweets that Amol has.
The number of sweets that Harry has is half the number of sweets that Gemma has.

Write down the ratio

the number of sweets that Amol has	:	the number of sweets that Gemma has	:	the number of sweets that Harry has

.....

(Total for Question 12 is 2 marks)

22 Rob has been asked to divide 120 in the ratio 3 : 5

Here is his working.

$120 \div 3 = 40$ $120 \div 5 = 24$

Rob's working is not correct.

Describe what Rob has done wrong.

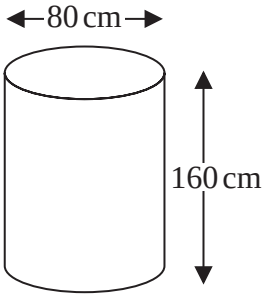
.....

.....

.....

(Total for Question 22 is 1 mark)

24 Karina has 4 tanks on her tractor.
Each tank is a cylinder with diameter 80 cm and height 160 cm.



The 4 tanks are to be filled completely with a mixture of fertiliser and water.

The fertiliser has to be mixed with water in the ratio 1 : 100 by volume.
Karina has 32 litres of fertiliser.

1 litre = 1000 cm^3

Has Karina enough fertiliser for the 4 tanks?
You must show how you get your answer.

(Total for Question 24 is 4 marks)

9 Here are the first five terms of a sequence.

3 8 13 18 23

(a) Write down the next term of this sequence.

.....

(1)

(b) Write down the ratio of the second term to the fourth term.
Give your ratio in its simplest form.

.....

(2)

(Total for Question 9 is 3 marks)

22 There are 48 counters in a bag.
There are only red counters and blue counters in the bag.

number of red counters : number of blue counters = 1 : 2

Helen has to work out how many red counters are in the bag.

She says,

"There are 24 red counters in the bag because 1 is half of 2 and 24 is half of 48"

Is Helen correct?
You must give a reason for your answer.

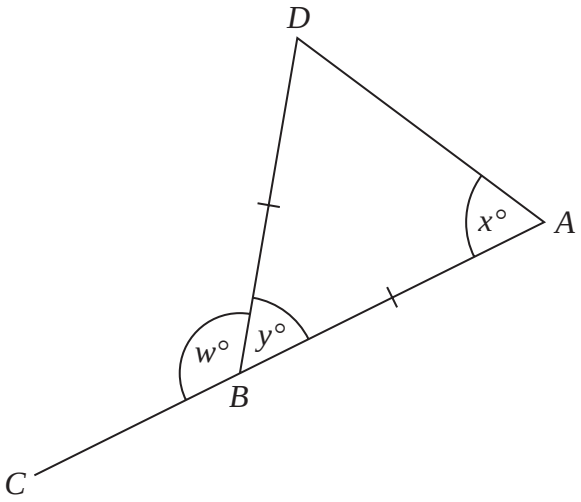
.....

.....

.....

(Total for Question 22 is 1 mark)

23 The diagram shows an isosceles triangle *ABD* and the straight line *ABC*.



$BA = BD$

$x : y = 2 : 1$

Work out the value of w.

$w =$ .....

(Total for Question 23 is 4 marks)

10 There are 24 red counters and 40 blue counters in a bag.

Write down the ratio of the number of red counters to the number of blue counters in the bag.
Give your ratio in its simplest form.

.....

(Total for Question 10 is 2 marks)

26 Chris, Debbie and Errol share some money in the ratio 3 : 4 : 2
Debbie gets £120

Chris then gives some of his share to Debbie and some of his share to Errol.
The money that Chris, Debbie and Errol each have is now in the ratio 2 : 5 : 3

How much money did Chris give to Errol?

£.....

(Total for Question 26 is 4 marks)

Question 65

10 There are 24 cows and 36 sheep on a farm.

Write as a ratio the number of cows to the number of sheep.
Give your ratio in its simplest form.

.....

(Total for Question 10 is 2 marks)

25 Andy, Luke and Tina share some sweets in the ratio $1:6:14$

Tina gives $\frac{3}{7}$ of her sweets to Andy.

Tina then gives $12\frac{1}{2}\%$ of the rest of her sweets to Luke.

Tina says,

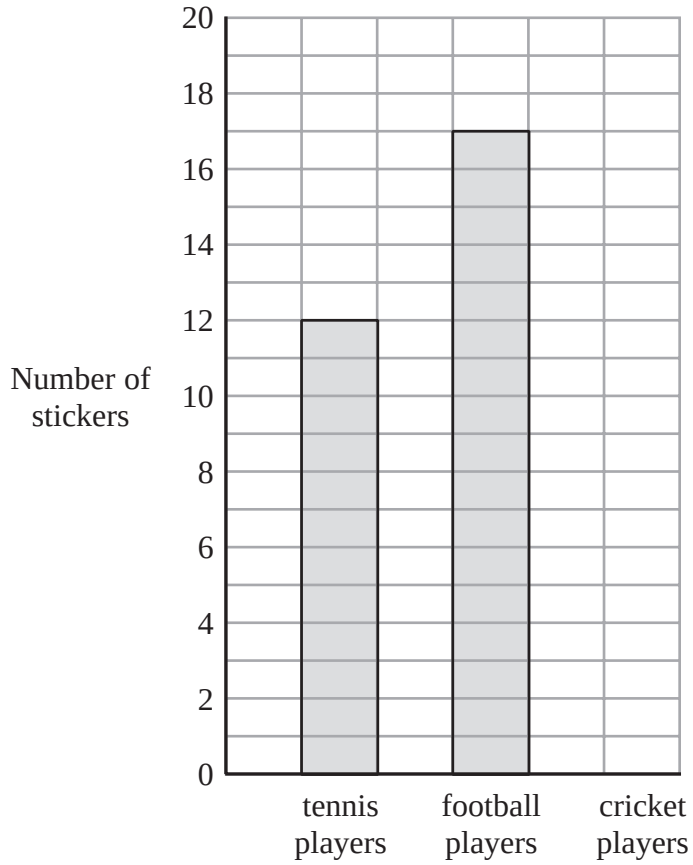
"Now all three of us have the same number of sweets."

Is Tina correct?
You must show how you get your answer.

(Total for Question 25 is 4 marks)

9 Milly collects stickers of sports players.
She only has stickers of tennis players, football players and cricket players.

The incomplete bar chart shows some information about the number of stickers Milly has.



Milly has a total of 40 stickers.

(a) Complete the bar chart.

(3)

(b) What fraction of the 40 stickers are stickers of tennis players?
Give your fraction in its simplest form.

.....

(2)

Ewan also collects stickers.
He only has large stickers and small stickers.

For Ewan's stickers,

$$\text{the number of large stickers} : \text{the number of small stickers} = 5 : 4$$

(c) Write down the fraction of Ewan's stickers that are large stickers.

.....

(1)

(d) Write the ratio $5 : 4$ in the form $n : 1$

.....

(1)

(Total for Question 9 is 7 marks)

17 Gita wants to make 24 litres of green paint.
She is going to mix blue paint, yellow paint and white paint in the ratio $4:3:1$

She has

12 litres of blue paint
7 litres of yellow paint
5 litres of white paint.

Does Gita have enough blue paint, yellow paint and white paint to make 24 litres of green paint?
You must show how you get your answer.

(Total for Question 17 is 3 marks)

Question 69

9 There are 90 red counters and 150 yellow counters in a bag.

Write down the ratio of the number of red counters to the number of yellow counters.
Give your ratio in its simplest form.

.....

(Total for Question 9 is 2 marks)

Question 70

10 20% of cars sold last year were electric cars.

Write down the ratio of

the number of electric cars sold last year to the number of non-electric cars sold last year.

Give your ratio in its simplest form.

.....

(Total for Question 10 is 2 marks)

21 Sid, Tam and Musa share £6900 in the ratio 2 : 3 : 5

Work out how much money each person receives.

Sid £.....

Tam £.....

Musa £.....

(Total for Question 21 is 3 marks)