

JustMaths

Methods

A selection of questions collated to explore the different methods you could use across a variety of topics.

Name: me1@justmaths.co.uk

Total Marks: _____

highlight/underline keywords

Q1. Here is a list of four fractions.

$$\frac{4}{16}$$

$$\frac{2}{8}$$

$$\frac{15}{60}$$

$$\frac{3}{9}$$

One of these fractions is not equivalent to $\frac{1}{4}$

Write down this fraction.

be explicit about using the 'arrows' to the top and bottom

$$\frac{4}{16} \div 4 = \frac{1}{4}$$

$$\frac{2}{8} \div 2 = \frac{1}{4}$$

$$\frac{15}{60} \div 15 = \frac{1}{4}$$

$$\frac{3}{9} \div 3 = \frac{1}{3}$$

so $\frac{3}{9}$ (1)

Q2. Write $\frac{4}{50}$ as a percentage. & emphasise "out of 100"

'arrow' diagrams also work horizontally

$$\frac{4}{50} \xrightarrow{\times 2} \frac{8}{100} \text{ so } 8\%$$

8 % (1)

Q3. There are 210 counters in a bag.
30% of these counters are red.
Work out the number of red counters in the bag.

$$\begin{aligned} 210 \\ 30\% &= \text{red} \\ 10\% &= 21 \quad \times 3 \\ 30\% &= 63 \end{aligned} \quad \begin{aligned} \searrow \\ \text{not red} &= 70\% \end{aligned}$$

63 (2)

Q4. Increase 240 by 20%

$$\begin{aligned} 10\% &= 24 \\ 20\% &= 48 \end{aligned} \quad \times 2$$

$$\text{so increase} \Rightarrow \begin{array}{r} 240 \\ + 48 \\ \hline 288 \end{array}$$

Look out for "what is x% of" type questions... students think this is the same as "what is x% off"

288 (3)

- Q5.** There are 84 calories in 100 g of banana.
There are 87 calories in 100 g of yogurt.

Priti has 60 g of banana and 150 g of yogurt for breakfast.

Work out the total number of calories in this breakfast.

Note... units are written down too...

Banana	Yogurt
84 calories = 100g	87 calories = 100g
$\div 10 \rightarrow 8.4 \text{ calories} = 10\text{g}$	$\div 2 \rightarrow 43.5 \text{ calories} = 50\text{g}$
$\times 6 \rightarrow 50.4 \text{ calories} = 60\text{g}$	$\times 2 \rightarrow 130.5 \text{ calories} = 150\text{g}$

$$\text{Total calories} = 50.4 +$$

we refer to this as scaling up or scaling down.

$$180.9 \dots\dots\dots (4)$$

- Q6.** Here is a list of ingredients for making 10 scones.

Mia wants to make 25 scones.
Work out how much sugar she needs.

Ingredients for 10 scones	
75 g	butter
350 g	self-raising flour
40 g	sugar
150 ml	milk
2	eggs

scaling down is often done above the original amount

$$\begin{array}{l}
 \div 2 \rightarrow 5 \text{ scones} = 20\text{g sugar} \\
 \div 2 \rightarrow 10 \text{ scones} = 40\text{g sugar} \\
 \times 2 \rightarrow 20 \text{ scones} = 80\text{g sugar}
 \end{array}$$

$$\begin{aligned}
 25 \text{ scones} &= 5 + 20 \\
 &= 20\text{g} + 80\text{g}
 \end{aligned}$$

$$100\text{g} \dots\dots\dots \text{g} (2)$$

- Q7.** A company orders a large number of plates from a factory.
It would take 30 hours to make all the plates using 4 machines.
How many machines are needed to make all the plates in 6 hours?

think...
does it make sense
that
more machines
↓
more time?
NO... so
its inverse
proportion.

time	machines
30 hours	4 machines
6 hours	20 machines

÷5 ↘ ↘ ×5.

..... 20 machines (2)

- Q8.** Ali, Ben and Cathy share an amount of money in the ratio 6 : 9 : 10
What fraction of the money does Ben get?

A	B	C	Total
□□□□□ □	□□□□□ □□□□	□□□□□ □□□□□	25

or

A	B	C	Total
6	9	10	25

we aim to move
students from
the concrete to
the abstract.

..... $\frac{9}{25}$ (2)

- Q9.** John makes clay cups. He makes 18 cups each hour. ✓
He makes cups for 6½ hours each day, on 5 days of the week. ✓
The cups are packed in boxes.
4 cups are packed into each box. ✓
How many boxes are needed for all the cups John makes in a week?

notice the
information
being ticked
off

$$\begin{array}{l}
 18 \text{ cups} = 1 \text{ hour} \\
 \times 6.5 \downarrow 117 \text{ cups} = 6.5 \text{ hours} \\
 \times 5 \downarrow 585 \text{ cups} = 1 \text{ week.}
 \end{array}
 \begin{array}{l}
 \times 6.5 \\
 \times 5
 \end{array}$$

$$\begin{array}{l}
 4 \text{ cups} = 1 \text{ box} \\
 585 \text{ cups} = 146.25 \\
 585 \div 4 = 80 \text{ } 147
 \end{array}$$

..... 147 (4)

- Q10.** Suha has a full 600 ml bottle of wallpaper remover. ✓
She is going to mix some of the wallpaper remover with water. ✓

Here is the information on the label of the bottle.

<p>Wallpaper remover 600 ml</p> <p>Mix $\frac{1}{4}$ of the wallpaper remover with 4500 ml of water</p>

Suha is going to use 750 ml of water. ✓

How many millilitres of wallpaper remover should

Suha use?

You must show your working.

$$\begin{array}{rcl}
 \text{wallpaper remover} & & \text{water} \\
 \frac{1}{4} \text{ of } 600 & & 4500 \text{ ml} \\
 150 \text{ ml} & = & 4500 \text{ ml} \\
 \div 6 \downarrow & & \downarrow \div 6 \\
 25 \text{ ml} & = & 750 \text{ ml} \\
 150 \div 6 & &
 \end{array}$$

$$4500 \div 750 = 6$$

..... 25 ml (4)

- Q11.** Sarah wants to buy some fruit.

She wants to buy

3 oranges at 30p each ✓
and $\frac{1}{2}$ kg apples at £1.20 per kg. ✓

The only money Sarah has is one 50p coin and six 20p coins. ✓

She pays for the fruit.

Work out how much money Sarah has left. ✓ You must show all your working.

it's ok to do workings next to the question.

$$\begin{array}{l}
 1 \times 50p = 50p \\
 6 \times 20p = 120p \\
 = £1.70
 \end{array}$$

wants.

$$3 \text{ oranges} \times 30p = 90p$$

$$\begin{array}{l}
 \text{Apples } 1 \text{ kg} = £1.20 \\
 \div 2 \downarrow \frac{1}{2} \text{ kg} = 60p \quad \downarrow \div 2
 \end{array}$$

$$\text{Total cost} = 90 + 60 = £1.50$$

$$\text{Change} = £1.70 - 1.50 = 20p$$

- Q12.** 30% of the people at a concert are female. ✓
1295 of the people at the concert are male. ✓

Work out the number of people at the concert who are female.

or draw a bar model

30%	70%
F	M

$1295 \div 7 = 185$
 $10\% = 185$
 $30\% = 555$

100%
 $30\% = \text{Female}$
 $70\% = \text{male}$
 $70\% = 1295$
 $\div 7 \rightarrow 10\% = 185$
 $\times 3 \rightarrow 30\% = 555$
 $\rightarrow \text{Female}$

555 are female

(3)

- Q13.** 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. 165

Black: 2
 $\downarrow \times 55$
 110

White: 1
 $\downarrow \times 55$
 55

Total: 3
 $\downarrow \times 55$
 165

40% taken out
 $10\% = 11$
 $40\% = 44$

$110 - 44$
 $= 66$

B : W
 66 : 55 $\rightarrow 6 : 5$

..... 6 : 5 (4)

indicates something changing

Q14. 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.

1	2	3	4	5
B G	G	G	G	G
$\times 16 \nearrow 16$ $1 : 2 \nearrow 32$ $\times 16$				
TOTAL = 48	48	48	48	48

$$\begin{aligned} \text{Total} &= 48 \times 5 \\ &= 240 \text{ students} \end{aligned}$$

Q15. Pat and Julie share some money in the ratio 2 : 5
Julie gets £45 more than Pat.

How much money did Pat get?

Pat	Julie	Total
2	5	7
$\underbrace{\quad\quad}_3$		
£45		
$\text{£}45 \div 3 = 15$		
$2 \times 15 = 30$	$5 \times 15 = 75$	
$\text{check } 75 - 30 = 45 \checkmark$		

(4)

Practice all the different ratio scenarios!

vertical bar models also help

P □□
 J □□□□□
 $45 \div 3 = 15$

£.....30..... (3)

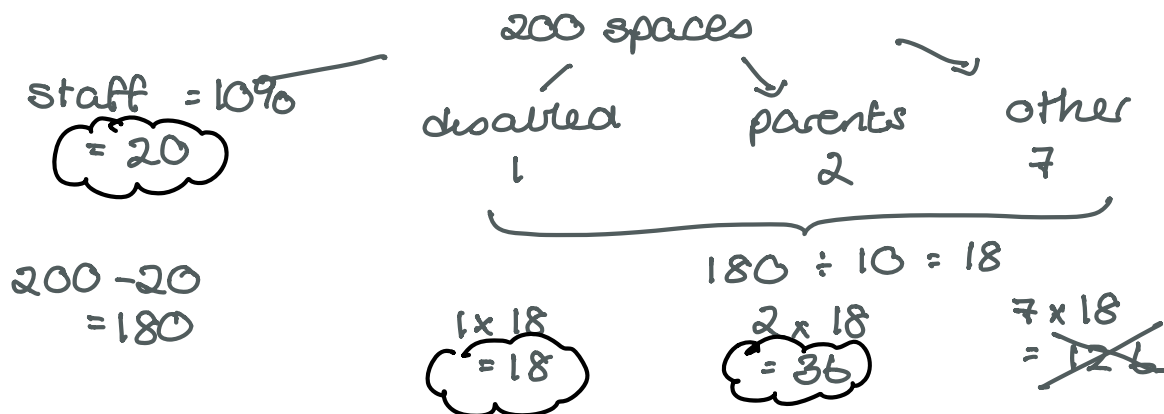
- Q16.** A supermarket car park has 200 spaces. ✓
10% of the spaces are for staff. ✓

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. ✓



signs for 20 + 18 + 36

..... 74 (4)

- Q17.** 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. ✓

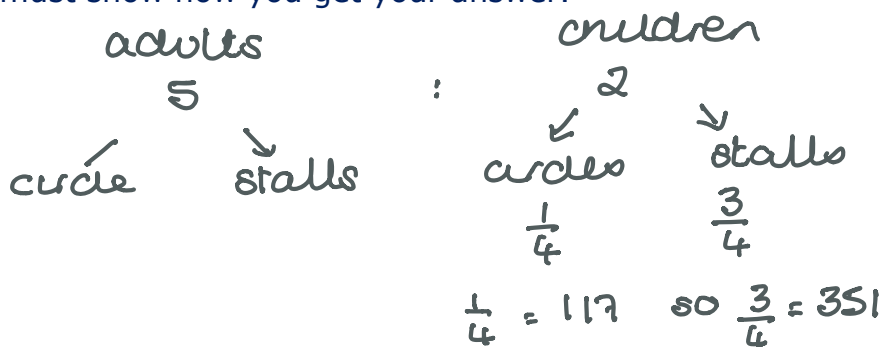
$\frac{3}{4}$ of the children had seats in the Stalls. ✓

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.



$$\text{Total} = 117 + 351 = 468$$

$$468 \div 2 \times 5 = 1170$$

$$\text{Total} = 1170 + 468 = 1638$$

Yes. 1638 > 1560

60% of 2600
10% = 260
x6 (60% = 1560) x6

Q18. A solid cuboid is made of metal. The metal has a density of 9 g/cm^3

The volume of the cuboid is 72 cm^3

Work out the mass of the cuboid.

list what you know

$$D = 9 \text{ g/cm}^3$$

$$m = ?$$

$$V = 72 \text{ cm}^3$$

$$\begin{array}{r} 9 \text{ g} : 1 \text{ cm}^3 \\ \times 72 \downarrow \quad \quad \quad \downarrow \times 72 \\ 648 \text{ g} \quad \quad 72 \text{ cm}^3 \end{array}$$

$$\dots\dots\dots 648 \dots\dots\dots \text{ g (2)}$$

Q19. Paulo drives at an average speed of 56 km/h for $1 \text{ hour } 45 \text{ minutes}$.

Work out the distance Paulo drives.

$$S = 56 \text{ km/hr}$$

$$D = ?$$

$$T = 1 \text{ hr } 45 \text{ mins}$$

$$\begin{array}{r} \cancel{14 \text{ km}} \quad \cancel{15 \text{ mins}} \\ \div 4 \quad \quad \quad \div 4 \\ 56 \text{ km} = 1 \text{ hr} \\ 42 \text{ km} = 45 \text{ mins} \\ \hline 98 \text{ km} = 1 \text{ hr } 45 \end{array} \quad \times 3$$

$$\dots\dots\dots 98 \dots\dots\dots \text{ km (3)}$$

Q20. 240 people work at a factory.

Of these people

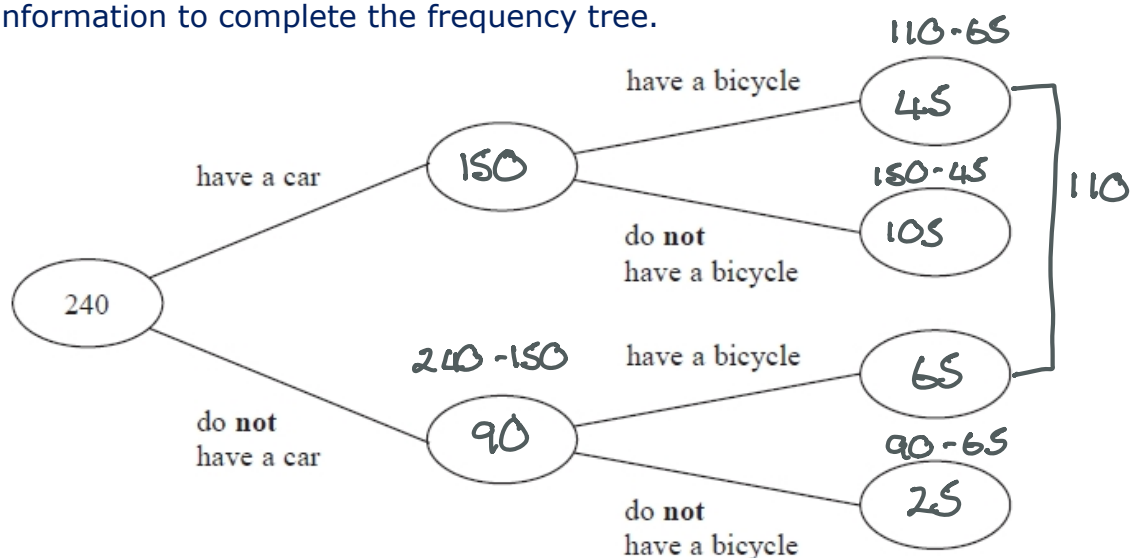
150 have a car ✓

110 have a bicycle ✓

65 of the people who have a bicycle do **not** have a car. ✓

check all the given information is on the tree

(a) Use this information to complete the frequency tree.



(3)

(b) What percentage of the 150 people who have a car also have a bicycle?

$$\frac{45}{150} \xrightarrow{\div 3} \frac{15}{50} \xrightarrow{\times 2} \frac{30}{100} = 30\%$$

(2)

Q21. Bronwin works in a restaurant. The table gives her rates of pay.

Day	Rate of pay
Monday to Friday	£8.40 per hour
Weekend	£11.20 per hour

Bronwin worked for a total of 20 hours last week. ✓

She worked 8 of these 20 hours at the weekend. ✓

Show that Bronwin was paid less than £200 last week.

$$\begin{array}{lcl}
 \text{Last week} & 20 \text{ hours} & \\
 \swarrow & \searrow & \\
 8 = \text{weekend} & 20 - 8 = 12 \text{ Mon-Fri} & \\
 8 \times 11.20 & 12 \times 8.40 & \\
 = £89.60 & = £100.80 & \\
 \text{Total } 89.60 + 100.80 = £190.40 & &
 \end{array}$$

encourage the use of
< or > for conclusions

$$190.40 < 200$$

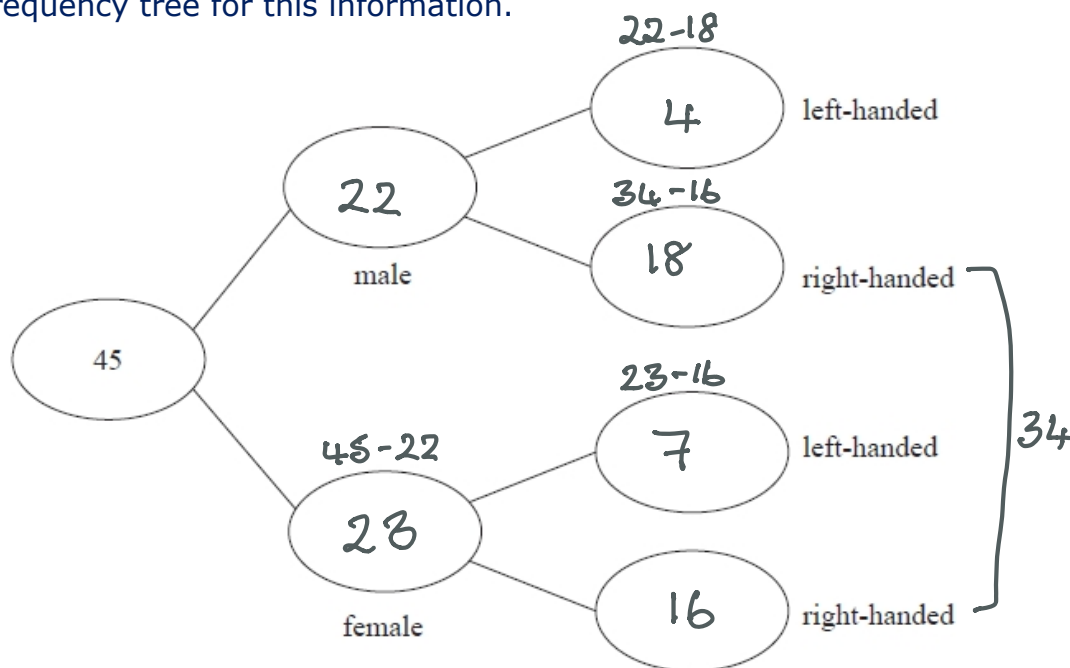
(3)

Q22. Each worker in a factory is either left-handed or right-handed.

22 of the 45 workers are male. ✓

16 of the 34 right-handed workers are female. ✓

Complete the frequency tree for this information.



(3)

Q23. 148 students each choose to study Geography or to study History.

- ✓ 72 of the students choose History.
- ✓ 34 boys choose Geography.
- ✓ 28 girls choose History.

Use this information to complete the two-way table.

76-34

	Geography	History	Total
Boys	34	<u>44</u>	<u>78</u>
Girls	<u>42</u>	28	<u>70</u>
Total	76	72	148

72-28

34+44

42+28

148-72

encourage students to get all the information in the table before working any missing information out.. (3)

- Q24. Emma has 45 rabbits. ✓
- 30 of the rabbits are male. ✓
 - 8 of the female rabbits have short hair.
 - 12 of the rabbits with long hair are male.

(a) Use the information to complete the two-way table.

	Male	Female	Total
Long hair	12	<u>7</u>	<u>19</u>
Short hair	<u>18</u>	8	<u>26</u>
Total	30	<u>15</u>	45

15-8

12+7

18+8

30-12

45-30

One of Emma's rabbits is chosen at random. 45

(b) Write down the probability that this rabbit is a female with short hair.

$$\frac{8}{45}$$

.....

(1)

Q25. Machine A and machine B both make car parts. ✓

Machine A makes 6 parts every 10 minutes. ✓

Machine B makes 13 parts every 15 minutes. ✓

On Monday

machine A makes parts for 12 hours

machine B makes parts for 10 hours

Work out the total number of parts made by the two machines on Monday.

A

$$\begin{array}{l} 6 \text{ parts} = 10 \text{ mins} \\ 36 \text{ parts} = 60 \text{ mins} \quad \swarrow \times 6 \\ 432 \text{ parts} = 12 \text{ hours} \quad \swarrow \times 12 \end{array}$$

B

$$\begin{array}{l} 13 \text{ parts} = 15 \text{ mins} \\ 52 \text{ parts} = 1 \text{ hour} \quad \swarrow \times 4 \\ 520 \text{ parts} = 10 \text{ hours} \quad \swarrow \times 10 \end{array}$$

$$\begin{array}{r} \text{Total} = 432 + \\ \quad \quad 520 \\ \hline 952 \end{array}$$

..... 952 (4)

Q26. The density of ethanol is 1.09 g/cm^3 ✓

The density of propylene is 0.97 g/cm^3 ✓

60 litres of ethanol are mixed with 128 litres of propylene to make 188 litres of antifreeze. ✓

Work out the density of the antifreeze. Give your answer correct to 2 decimal places.

	ethanol		Prop		antifreeze	
	1.09 g/cm^3		0.97 g/cm^3		$\boxed{1.008...}$	$\frac{189560}{188000}$
D						
m	60000×1.09	+	128000×0.97	→	189560 g	
	$= 65400 \text{ g}$		124160 g			
✓	60 litres	+	128 litres	→	188 litres	
	60000 cm^3		128000 cm^3		188000 cm^3	

Compound measures

are made up of two measures $1.0082 \dots$ so 1.01 g/cm^3 (4)
 so don't follow the normal two way table rules.

- Q27.** Jessica runs for 15 minutes at an average speed of 6 miles per hour. ✓
 She then runs for 40 minutes at an average speed of 9 miles per hour. ✓
 It takes Amy 45 minutes to run the same total distance that Jessica runs. ✓

Work out Amy's average speed.
 Give your answer in miles per hour.

	PART 1	PART 2	TOTAL
Speed.	6 miles/hour	9 miles/hour	
Dist.	1.5 miles	6 miles	7.5 miles
Time	15 mins	40 mins	

$6 \text{ miles} = 1 \text{ hr}$
 $1.5 \text{ miles} = 15 \text{ mins} \div 4$

$9 \text{ miles} = 1 \text{ hr}$
 $3 \text{ miles} = 20 \text{ mins} \div 3$
 $6 \text{ miles} = 40 \text{ mins} \times 2$

Amy
 45 mins = 7.5 miles
 $\div 3 \rightarrow 15 \text{ mins} = 2.5 \text{ miles}$
 $\times 4 \rightarrow 1 \text{ hour} = 10 \text{ miles}$

..... 10 miles per hour (4)

- Q28.** Wayne begins walking at 8:30 am.
 He walks for 1 hour and 45 minutes.
 Wayne then rests for 15 minutes.
 He then walks for 85 minutes to a cafe. $85 \text{ mins} = 1 \text{ hr } 25 \text{ mins}$
 Does Wayne get to the cafe before 12 noon? You must show how you get your answer.



Yes, 11:55 am is before 12 noon

Q29. A piece of glass has a mass of 27 g and a volume of 10 cm³
Work out the density of the piece of glass.

$$\begin{aligned} D &= ? \\ m &= 27\text{g} \\ V &= 10\text{cm}^3 \end{aligned}$$

$$\begin{aligned} 27\text{g} &= 10\text{cm}^3 \\ 2.7\text{g} &= 1\text{cm}^3 \quad \div 10 \end{aligned}$$

$$\dots\dots\dots 2.7 \dots\dots\dots \text{g/cm}^3 \quad (2)$$

Q30. Riley travelled by car and by aeroplane. ✓

He travelled 143 miles by car at an average speed of 55 miles per hour. ✓
Riley then travelled for 5 hours and 20 minutes by aeroplane. ✓

Work out, in hours and minutes, Riley's total travelling time.

	CAR	PLANE	TOTAL
S	55mph		
D	143miles		<u>2.6 hours</u>
T		5hrs 20mins	0.1 hour = 6mins 0.6 hours = 36mins so 5hrs + 2hrs + 20mins + 36mins

make it clear what you are aiming to find.

$55 \text{ miles} = 1 \text{ hour}$
 $\times 2.6$
 \downarrow
 $143 \text{ miles} = 2.6 \text{ hours}$

$$143 \div 55 = 2.6 \quad \dots\dots\dots 7 \dots\dots\dots \text{hours} \quad \dots\dots\dots 56 \dots\dots\dots \text{minutes} \quad (3)$$

Q31. On an activity day students play one sport. They play football or hockey or tennis.

120 students are on the activity day. ✓

30 of the students are boys. ✓

12 of the boys and 26 of the girls play hockey. ✓

45 of the students play football. ✓

35 of the 45 students who play football are girls. ✓

Work out the number of girls who play tennis. $30 - 12 - 12$

	F	H	T	Total
B	<u>10</u>	12	<u>8</u>	30
G	<u>35</u>	26	<u>29</u>	<u>90</u>
Total	45	<u>38</u>	<u>37</u>	120

$45 - 35$ $12 + 26$ $120 - 45 - 38 = 29$

$120 - 30$

Q32. Jean is going to the beach.

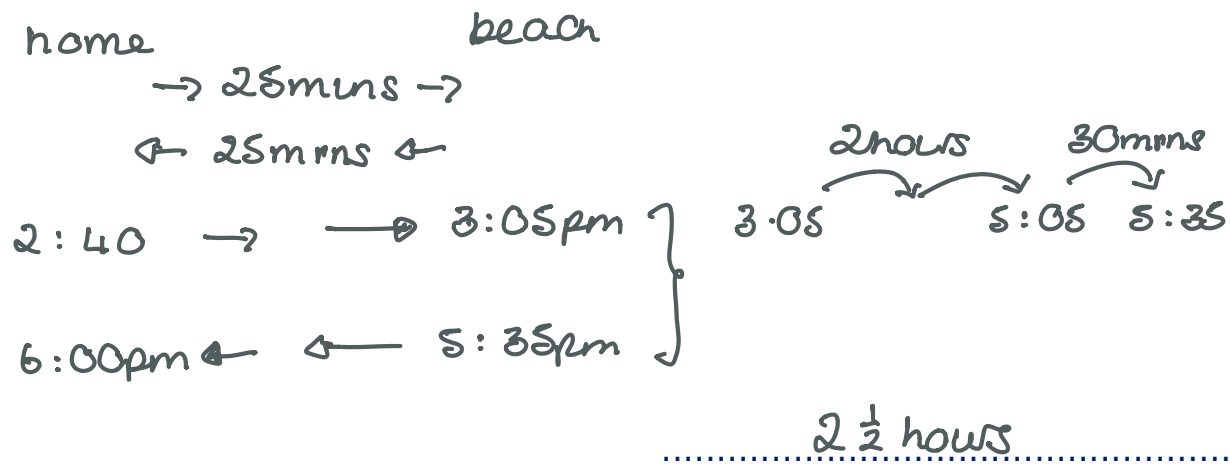
It takes her 25 minutes to get from her home to the beach. ✓

It takes her 25 minutes to get from the beach to her home. ✓

Jean leaves home at 2.40 pm. ✓

She has to get home by 6 pm. ✓

What is the greatest length of time Jean can stay at the beach?



Q33. Change 9 metres into centimetres.

$$1 \text{ metre} = 100 \text{ cm} \times 9$$

$$9 \times 100 = 900 \text{ cm}$$

..... 900 centimetres (1)

Q34. There are only red beads and green beads in a bag.

number of red beads : number of green beads = 1 : 4

There are 35 red beads in the bag.

Work out the total number of beads in the bag.

R	B	Total
1	4	5
35	140	175

..... 175 (2)

Q35. 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.

R	:	B
24	:	40
÷2 → 12	:	20
÷2 → 6	:	10
÷2 → 3	:	5

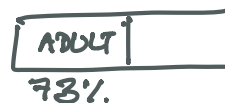
..... 3 : 5 (2)

Q36. Last week, 73% of the tickets sold at a cinema were adult tickets.

(a) What percentage of the tickets sold were **not** adult tickets?

adult
73%

not adult
 $100 - 73$
 $= 27$



..... 27 % (1)

Some people watched a film at the cinema.

number of adults : number of children = 2 : 5

(b) What fraction of these people were adults?



$\frac{2}{7}$

..... (1)

On Friday,

500 people watched a film at the cinema.

70% of these people were children.

On Saturday,

720 people watched the film at the cinema.

$\frac{5}{8}$ of these people were children.

Kasim thinks more children watched the film on Friday than on Saturday.

(c) Is Kasim correct? You must show how you get your answer.

FRIDAY

500

70% = children 30% = adults

10% = 50
70% = 350

SATURDAY

720

$\frac{5}{8}$ of 720 $\frac{3}{8}$ = adults

$(720 \div 8) \times 5 = 450$

Kasim is wrong

450 > 350

(3)

- Q37.** Rafael and Roger played tennis against each other 30 times. ✓
 Each of the times they played, either Rafael won or Roger won. ✓
 The ratio of the number of times Rafael won to the number of times Roger won is 7 : 3 ✓

(a) Work out the number of times Rafael won.

$$\begin{array}{rcl} \text{Raf} & : & \text{Rog} \\ 7 & : & 3 \\ \downarrow \times 3 & & \\ 21 & & \end{array} \quad \begin{array}{rcl} \text{Total} & & \\ 10 & & \\ 30 \text{ games} & \downarrow \times 3 & \end{array}$$

..... 21 (2)

- In a school, there are 75 girls in the tennis squad. ✓
 The ratio of the number of boys in the tennis squad to the number of girls in the tennis squad is 4 : 3 ✓

(b) Work out the number of boys in the tennis squad.

$$\begin{array}{rcl} \text{G} & & \text{B} \\ 75 & : & 100 \\ \uparrow \times 25 & & \uparrow \times 25 \\ 3 & : & 4 \end{array}$$

..... 100 (2)

- Q38.** Here is a list of ingredients to make 12 chocolate cupcakes. ✓
 James wants to make exactly 30 cupcakes.

(a) How much butter does James need?

$$\begin{array}{rcl} \div 2 \uparrow 55\text{g} & = & 6 \text{ cupcakes} \uparrow \div 2 \\ 110\text{g} & = & 12 \text{ cupcakes} \\ \times 2 \downarrow 220\text{g} & = & 24 \text{ cupcakes} \downarrow \times 2 \\ 30 \text{ cupcakes} & = & 55 + 220 \end{array}$$

Chocolate cupcakes
Ingredients for 12 cupcakes
110 g butter
100 g sugar
75 g flour
25 g cocoa
2 eggs

..... 275 g (2)

Sophie made some chocolate cupcakes for a party.
 She used 375 g of sugar.

(b) How many cupcakes did Sophie make?

$$\begin{array}{rcl} 75\text{g} & = & 9 \text{ cupcakes} \\ 100\text{g} & = & 12 \text{ cupcakes} \\ \times 3 \downarrow 300\text{g} & = & 36 \text{ cupcakes} \end{array} \quad \begin{array}{rcl} 36 + 9 & & \\ 45 & & \end{array}$$

..... 45 (2)

Q39. Work out the difference between the largest share and the smallest share when 3450 yen is divided in the ratios 2 : 6 : 7

A	B	C	Total	
$\times 230$ 2	$\times 230$ 6	$\times 230$ 7	15	$3450 \div 15$
460	1380	1610	3450	= 230

Difference = $1610 - 460$

..... 1150 yen (3)

Q40. Louis makes a model of a plane.

The wingspan of the model is 50 centimetres. ✓

The wingspan of the real plane is 80 metres. ✓



(a) Work out the scale of the model. Give your answer in the form 1: n

don't be afraid to draw rubbish pictures!

	model	:	real	
	50cm	:	80 metres	
	0.5m	:	80 metres	
$\times 2$	1m	:	160 metres	$\times 2$

1: 160 (2)

The length of the real plane is 72 metres. ✓

(b) Work out the length of the model. ✓

Give your answer in centimetres.

	model	:	real	
	0.5m	:	80 metres	
		:	1m	
	0.45m	=	72 metres	

$\div 80$
 $\times 72$

$0.45m = 45cm$

..... 45 centimetres (2)

Refer to Venn diagrams where we aim to get the "overlap" first...

Q41. In a box,

number of red buttons : number of blue buttons = 5 : 3

number of blue buttons : number of green buttons = 1 : 2



There are 48 green buttons in the box.

Work out the number of red buttons in the box.

$$\begin{array}{l} R : B \\ 5 : 3 \\ 5 : 3 \end{array}$$

$$\begin{array}{l} B : G \\ 1 : 2 \\ \downarrow \times 3 \\ 3 : 6 \end{array}$$

so	R	B	G	Total
	5	3	6	14
	<u>40</u>	<u>24</u>	48 $\downarrow \times 8$	<u> </u>

40

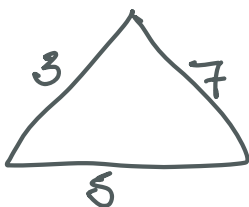
..... (4)

Q42. The perimeter of a triangle is 90 cm.

The lengths of the sides of the triangle are in the ratios 3 : 5 : 7.

Work out the length of the longest side of the triangle.

Draw a picture! it doesn't have to be accurate...



Perimeter = 90

side a	side b	side c	Perimeter
3	5	7	15
$\downarrow \times 6$	$\downarrow \times 6$	$\downarrow \times 6$	$\downarrow \times 6$
18	30	42	90

check:

$$18 + 30 + 42 = 90$$

longest side = 42 cm (5)

Q43. Jack, Kate and Lila share some money in the ratios 5 : 9 : 6

In total, Jack and Kate receive £56

Work out the amount of money Lila receives.

J	K	L	Total	check
5	9	6	20	$20 + 36 = 56$
$\underbrace{\hspace{10em}}_{56 \div 14 = 4}$			$\downarrow \times 4$	
		24	80	
$\times 4$	$\times 4$			
= 20	= 36		£ 24	(3)

Q44. Lisa, Max and Punita share £240 in the ratio 3 : 4 : 8

How much more money than Lisa does Punita get?

L	M	P	Total	
3	4	8	15	$240 \div 15 = 16$
$\downarrow \times 16$	$\downarrow \times 16$	$\downarrow \times 16$	$\downarrow \times 16$	
48	64	128	240	
$128 - 48$				
£ 80				(3)

Q45. A school has 840 pupils and 40 teachers. ✓

(a) Find the ratio of the number of pupils to the number of teachers. Give your ratio in the form $n : 1$ ✓

P	:	T	
840	:	40	
$\div 40$		$\div 40$	
21	:	1	
			21 : 1 (2)

In Year 11 at the school, the ratio of the number of pupils who study Chemistry to the number of pupils who study Physics is 3 : 2

(b) 105 pupils in Year 11 study Chemistry. Work out the number of pupils in Year 11 who study Physics.

C	:	P	
3	:	2	
$\times 35$		$\times 35$	
105	:	70	
			70 (2)

For the 105 pupils who study Chemistry, the ratio of the number of boys to the number of girls is 4 : 3

- (c) Work out the number of girls in Year 11 who study Chemistry.

B	G	Total
4	3	7
$\downarrow \times 15$	$\downarrow \times 15$	$\downarrow \times 15$
60	45	105

$$105 \div 7 = 15$$

check $60 + 45 = 105 \checkmark$

..... 45 (2)

Q46. In a school, there are 320 girls and 500 boys.

check the "order"
doesn't change.

- (a) Write down the ratio of the number of girls to the number of boys.
Give your ratio in its simplest form.

G	B
320	500
$\div 10 \downarrow$	$\div 10 \downarrow$
32	50
$\div 2 \downarrow$	$\div 2 \downarrow$
16	25

..... 16 : 25

(2)

read every
word!!

In a different school, there is a total of 640 children.

In this school, the ratio of the number of girls to the number of boys is 7 : 9

- (b) How many boys are there in this school?

G	:	B	Total
7	:	9	16
$\downarrow \times 40$		$\downarrow \times 40$	$\downarrow \times 40$
280		360	640

..... 360

(2)

$$640 \div 16 = 40$$

check $280 + 360 = 640 \checkmark$