Chhetri Academy

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GCSE MATHS

Ratio, proportion and rates of change

Edexcel 1MA1 | Subtopic collection Topic 32

Percentages and reverse percentages

Higher tier

Past paper question booklet

153	2003-2025	Higher
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.

3. A garage keeps records of the costs of repairs to its customers' cars.
The table gives information about the costs of all repairs which were less than £250 in one week.

Leave blank

Cost, (£C)	Frequency
$0 < C \leqslant 50$	4
$50 < C \leqslant 100$	8
$100 < C \leqslant 150$	7
$150 < C \leqslant 200$	10
$200 < C \leqslant 250$	11

(a) Find the class interval in which the median lies.

. .....

(2)

There was only one further repair that week, not included in the table.
That repair cost £1000.

Dave says 'The class interval in which the median lies will change.'

(b) Is Dave correct? Explain your answer.

.....

.....

(1)

The garage also sells cars.
It offers a discount of 20% off the normal price for cash.

Dave pays £5200 cash for a car.

(c) Calculate the normal price of the car.

£ .....

(3)

18.

(a) Find the value of $16^{\frac{1}{2}}$

.....
(1)

(b) Given that $\sqrt{40} = k\sqrt{10}$, find the value of k.

.....
(1)

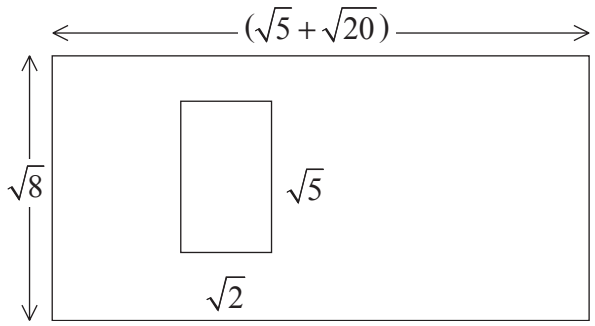


Diagram **NOT** accurately drawn

A large rectangular piece of card is $(\sqrt{5}+\sqrt{20})$ cm long and $\sqrt{8}$ cm wide.

A small rectangle $\sqrt{2}$ cm long and $\sqrt{5}$ cm wide is cut out of the piece of card.

(c) Express the area of the card that is left as a percentage of the area of the large rectangle.

%
.....
(4)

2. Three women earned a total of £36
They shared the £36 in the ratio 7:3:2

Donna received the largest amount.

(a) Work out the amount Donna received.

£.....
(3)

A year ago, Donna weighed 51.5 kg.
Donna now weighs $8\frac{1}{2}\%$ less.

(b) Work out how much Donna now weighs.
Give your answer to an appropriate degree of accuracy.

..... kg
(4)

(Total 7 marks)

Q2

7. In a sale, normal prices are reduced by 20%.

Andrew bought a saddle for his horse in the sale.
The sale price of the saddle was £220

Calculate the normal price of the saddle.



£ .....

(Total 3 marks)

Q7

10. A computer costs £360 plus $17\frac{1}{2}$% VAT.

Calculate the total cost of the computer.



£360

plus

$17\frac{1}{2}$% VAT

£ .....

Q10

(Total 3 marks)

21. In a sale, normal prices are reduced by 12%.
The sale price of a digital camera is £132.88

Work out the normal price of the digital camera.

£ .....

(Total 3 marks)

Q21

9. Work out £84 as a percentage of £350

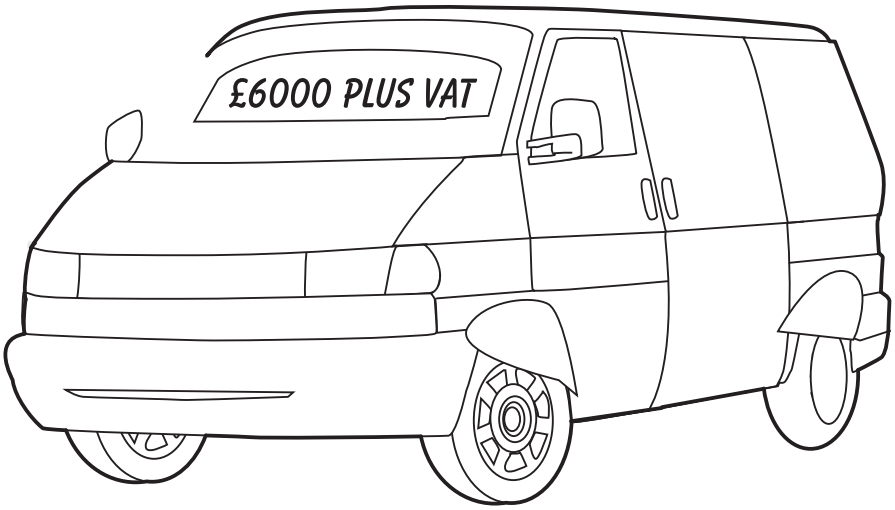
..... %

(Total 2 marks)

Blank

Q9

11. Lizzie bought a van.
The total cost of the van was £6000 **plus** VAT at $17\frac{1}{2}$%.



Lizzie paid £3000 when she got the van.
She paid the rest of the total cost of the van in 10 equal monthly payments.

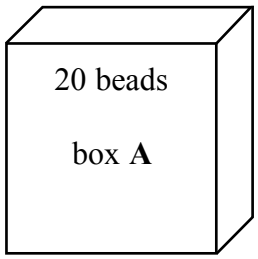
Work out the amount of each monthly payment.

£ .....

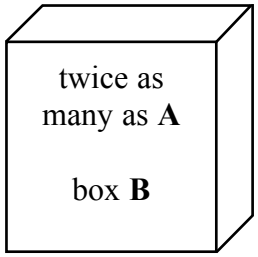
(Total 6 marks)

Q11

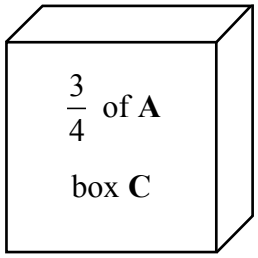
3. There are 20 beads in box **A**.



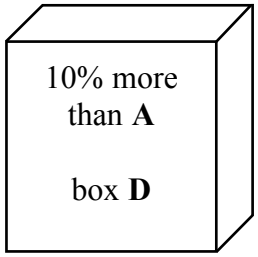
In box **B** there are twice as many beads as in box **A**.



In box **C** there are $\frac{3}{4}$ of the number of beads as in box **A**.



In box **D** there are 10% **more** beads than in box **A**.



Work out the **total** number of beads in the four boxes.

..... beads

(Total 4 marks)

Q3

7. Noah got 8 out of 20 in a test.

Write 8 out of 20 as a percentage.

..... %

(Total 2 marks)

Q7

***2** Mr and Mrs Jones are planning a holiday to the Majestic Hotel in the Cape Verde Islands.

The table gives information about the prices of holidays to the Majestic Hotel.

MAJESTIC HOTEL, Cape Verde Islands		
Departures	**Price per adult**	
	7 nights	**14 nights**
1 Jan – 8 Jan	£ 694	£ 825
9 Jan – 28 Jan	£ 679	£ 804
29 Jan – 5 Feb	£ 687	£ 815
6 Feb – 18 Feb	£ 769	£ 835
19 Feb – 8 Mar	£ 714	£ 817
9 Mar – 31 Mar	£ 685	£ 805
1 April – 9 April	£ 788	£ 862
10 April – 30 April	£ 748	£ 802
Price per child: 95% of adult price for 7 nights or 85% of adult price for 14 nights.		

Mr and Mrs Jones are thinking about going on holiday

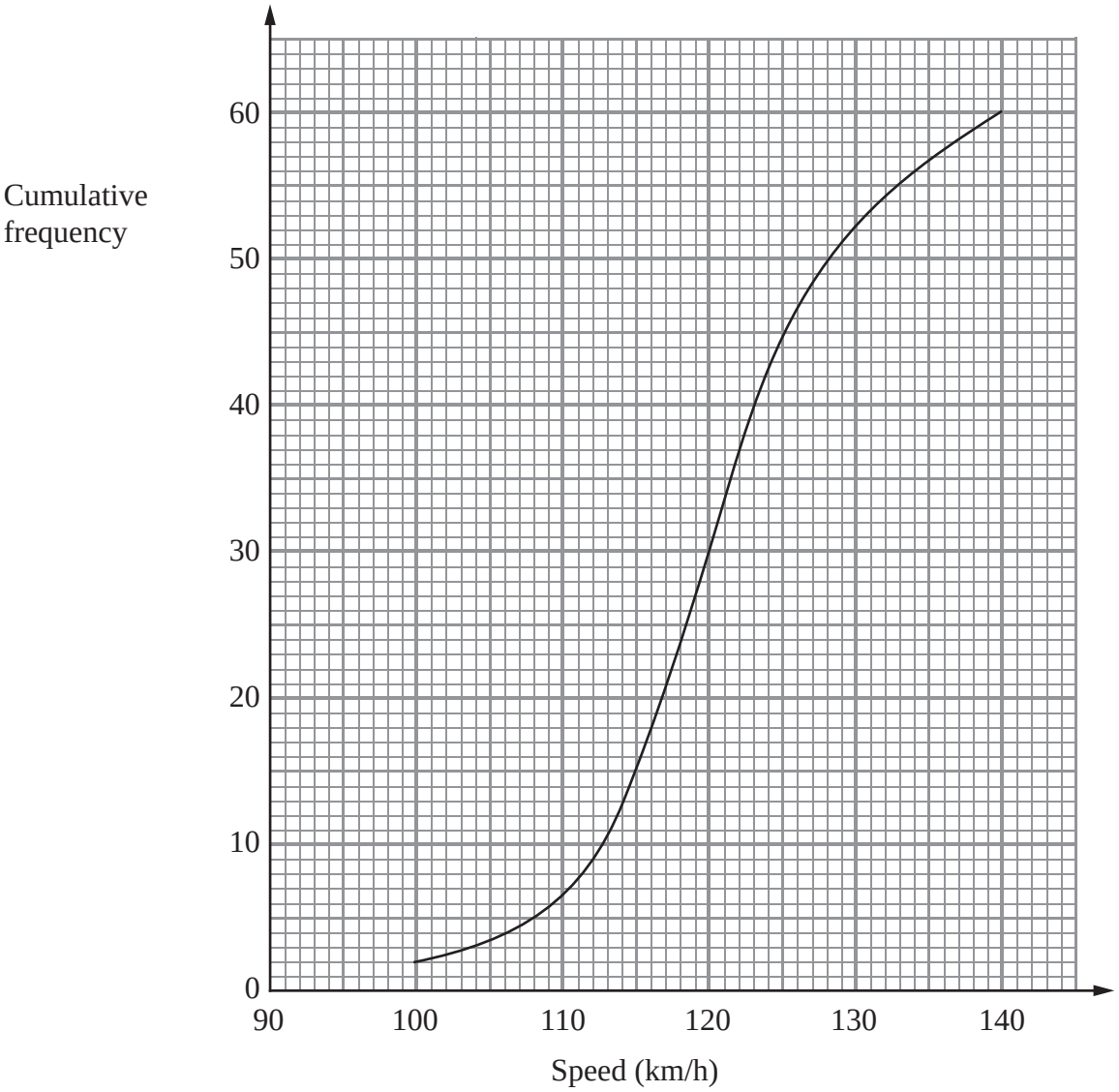
on 20 February for 7 nights
or on 10 April for 14 nights.

Mr and Mrs Jones have 2 children.

Compare the costs of these two holidays for the Jones family.

(Total for Question 2 is 5 marks)

9 The cumulative frequency graph shows information about the speeds of 60 cars on a motorway one Sunday morning.



(a) Use the graph to find an estimate for the median speed.

..... km/h

(1)

The speed limit on this motorway is 130 km/h.
The traffic police say that more than 20% of cars travelling on the motorway break the speed limit.

(b) Comment on what the traffic police say.

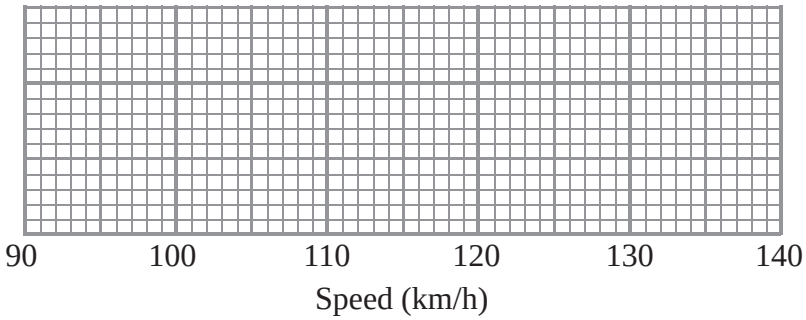
(3)

For these 60 cars

the minimum speed was 97 km/h
and the maximum speed was 138 km/h.

(c) Use the cumulative frequency graph and the information above to draw a box plot showing information about the speeds of the cars.

(3)



(Total for Question 9 is 7 marks)

3 Work out 15% of £80

£ .....

(Total for Question 3 is 2 marks)

9 Last year, Jora spent

30% of his salary on rent

$\frac{2}{5}$ of his salary on entertainment

$\frac{1}{4}$ of his salary on living expenses.

He saved the rest of his salary.

Jora spent £3600 on living expenses.

Work out how much money he saved.

£ .....

(Total for Question 9 is 5 marks)

3 A shop sells freezers and cookers.

The ratio of the number of freezers sold to the number of cookers sold is 5 : 2
The shop sells a total of 140 freezers and cookers in one week.

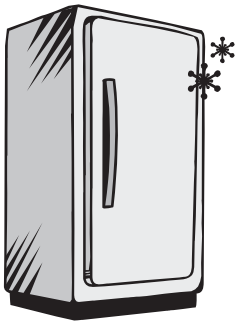
*(a) Work out the number of freezers and the number of cookers sold that week.

(3)

Jake buys this freezer in a sale.
The price of the freezer is reduced by 20%.

(b) Work out how much Jake saves.

Freezer
Original Price
£145



£ .....

(2)

(Total for Question 3 is 5 marks)

8 The table shows the costs, per person, of a holiday at two different hotels.
It shows the cost for 5 nights and the cost for each extra night.
It also shows the discount for each child.

	Park Palace		**Dubai Grand**	
Date holiday starts	5 nights	extra night	5 nights	extra night
01 Jan – 31 Mar	£1169	£150	£849	£86
01 Apr – 09 Apr	£1229	£150	£1219	£95
10 Apr – 15 Jul	£810	£80	£853	£53
16 Jul – 20 Aug	£810	£80	£854	£53
21 Aug – 10 Dec	£810	£80	£869	£94
Discount for each child	$\frac{1}{5}$ off		15% off	

There are two adults and two children in the Smith family.
The family want a holiday for 7 nights, starting on 1st August.

One hotel will be cheaper for them than the other hotel.

Work out the cost of the cheaper holiday.
You must show all your working.

£ .....

(Total for Question 8 is 6 marks)

16. In a sale the normal price of a book is reduced by 10%.
The sale price of the book is £4.86

Calculate the normal price of the book.

£.....

Q16

(Total 3 marks)

3 Build-a-mix makes concrete.

1 cubic metre of concrete has a weight of 2400 kg.

15% of the concrete is water.

The rest of the ingredients of concrete are cement, sand and stone.
The weights of these ingredients are in the ratio 1 : 2 : 5

(a) Work out the weight of cement, of sand and of stone in 1 cubic metre of concrete.

cement = ... kg

sand = ... kg

stone = ... kg

(4)

Build-a-mix needs to make 30 cubic metres of concrete.
Build-a-mix has only got 6.5 tonnes of cement.

*(b) Will this be enough cement for Build-a-mix to make 30 cubic metres of concrete?
You must show all of your working.

(3)

(Total for Question 3 is 7 marks)

Question 19

4 Lydia is buying a ring.
The ring costs £60
She pays a deposit of 40%.

Work out how much she pays as the deposit.

£ .....

(Total for Question 4 is 2 marks)

1. Theo earns £20 one weekend.
He gives £4 to his brother.

(a) Express £4 as a fraction of £20
Give your answer in its simplest form.

.....
(2)

Theo gives £6 to his mother.

(b) Express £6 as a percentage of £20

..... %
(2)

Theo spent the remaining £10 on bus fares and food.
He spent £1.50 more on bus fares than on food.

(c) How much did he spend on bus fares?

£ .....
(2)

Q1

(Total 6 marks)

9. Two shops both sell the same type of suit.
In both shops the price of the suit was £180

One shop increases the price of the suit by $17\frac{1}{2}\%$.

The other shop increases the price of the suit by $22\frac{1}{2}\%$.

Calculate the difference between the new prices of the suits in the two shops.

£ .....

(Total 3 marks)

Q9

2. Ishmal invested £3500 for 3 years at 2.5% per annum **simple interest**.

Work out the total amount of interest Ishmal earned.

£ .....

(Total 3 marks)

Q2

3 Priya is raising money for a charity by selling tomato plants that she has grown from seeds.

She sells 48 tomato plants for £1.35 each.



Priya keeps 15% of the money she gets to pay for the growbags and seeds that she used.
She sends the rest of the money to the charity.

How much money did she send to the charity?

£ .....

(Total for Question 3 is 6 marks)

***4** Debra and Mark are planning to go on a cruise.
They can travel with one of two companies, Caribbean Calypso or Royal European.

The table shows the cost per person to travel with each company.

		Type of cabin			
		Inside	Outside	Balcony	Suite
Cost per person	Caribbean Calypso	£1136	£1319	£1529	£2329
	Royal European	£1043	£1263	£1484	£2147

Caribbean Calypso has a discount of 10% if you book online.
Royal European has a discount of 5% if you book online.

Debra and Mark are going to book a suite for their cruise.
They are going to book online.

Debra and Mark want to pay the lowest possible cost.
Which company should they choose?
You must show all your working.

(Total for Question 4 is 5 marks)

***10** Railtickets and Cheaptrains are two websites selling train tickets.

Each of the websites adds a credit card charge and a booking fee to the ticket price.

Railtickets	**Cheaptrains**
Credit card charge: 2.25% of ticket price	Credit card charge: 1.5% of ticket price
Booking fee: 80 pence	Booking fee: £1.90

Nadia wants to buy a train ticket.
The ticket price is £60 on each website.
Nadia will pay by credit card.

Will it be cheaper for Nadia to buy the train ticket from Railtickets or from Cheaptrains?

(Total for Question 10 is 4 marks)

***4** Pete and Sue are going to take their children to France.
They will travel together on the same ferry.
They will travel with one of two ferry companies, Easy Ferry or Seawagon.

The tables give information about the costs for each adult and each child to travel with these ferry companies.

Easy Ferry	**July**			**August**		
Date	**1 – 10**	**11 – 21**	**22 – 31**	**1 – 10**	**11 – 21**	**22 – 31**
Adult	£32.00	£36.50	£39.50	£42.25	£42.25	£37.75
Child	£18.00	£20.25	£23.75	£25.85	£25.85	£21.00

Seawagon	**July**			**August**		
Date	**1 – 10**	**11 – 21**	**22 – 31**	**1 – 10**	**11 – 21**	**22 – 31**
Adult	£33.50	£37.50	£40.25	£43.85	£44.95	£38.50
Child	£17.25	£19.75	£21.85	£24.65	£23.95	£19.95

The table below gives information about the discount they will get from each ferry company if they book early.

Early booking discount	
Easy Ferry	$\frac{1}{3}$ off
Seawagon	25% off

Pete and Sue have three children.
They will travel on 25 July.
They will book early.

Pete and Sue will travel with the cheaper ferry company.

Which ferry company?
You must show all your working.

(Total for Question 4 is 5 marks)

Question 27

5 A TV costs £400
Peter pays a deposit of 15%.

How much does Peter still have to pay for the TV?



£ .....

(Total for Question 5 is 3 marks)

4 A cooker costs £650 plus 20% VAT.

(a) Calculate the total cost of the cooker.

£ .....

(3)

A washing machine has a price of £260
In a sale its price is reduced by £39

(b) Write the reduction as a percentage of the price.

..... %

(2)

3 kitchen chairs cost a total of £44.79

(c) Work out the total cost of 8 of these chairs.

£ .....

(2)

(Total for Question 4 is 7 marks)

*3 A company sells boxes to factories.
Fred buys boxes.
The boxes are sold in packs of 1000
Each pack costs £193.86

Fred orders 3 packs of boxes.
He gets a discount on his total order.

The table shows the discount he will get.

Total Order	Discount
£100 - £300	5%
£301 - £400	10%
£401 and above	15%

Work out the total cost of the order after the discount.
You must show your working.

(Total for Question 3 is 5 marks)

Question 30

16 Bill's weight decreases from 64.8 kg to 59.3 kg.

Calculate the percentage decrease in Bill's weight.
Give your answer correct to 3 significant figures.

.....%

(Total for Question 16 is 3 marks)

***8** Joan is planning a skiing holiday in Hinterglemm for herself and her two children.
They are going skiing for 6 days.

The table shows the costs of ski hire, of boot hire and of buying lift passes in two shops in Hinterglemm.
All prices are in Euros.

Shop A

		Ski hire	Boot hire	Lift pass
Adult	**6 days**	111	53	236
	13 days	168	90	314
Child	**6 days**	78	52	165
	13 days	122	87	210

Shop B

		Ski hire	Boot hire	Lift pass
Adult	**6 days**	108	54	242
	13 days	170	89	324
Child	**6 days**	68	48	160
	13 days	118	85	205

Joan will use her own skis and her own boots.

For 6 days she will need

to hire skis for each of her two children
to hire boots for each of her two children
and to buy lift passes for herself and each of her two children.

Shop A gives 5% off the total cost.
Shop B gives 3% off the total cost.

Joan wants to hire the skis and boots and buy the lift passes from the same shop.
She wants to get everything from the cheaper shop.

Which shop is cheaper for Joan?
You must show all your working.

(Total for Question 8 is 5 marks)

***4** Gordon owns a shop.

Here are the prices of three items in Gordon's shop and in a Supermarket.

Gordon's Shop	
400 g loaf of bread	£1.22
1 litre of milk	£0.96
40 tea bags	£2.42

Supermarket	
400 g loaf of bread	£1.15
1 litre of milk	£0.86
40 tea bags	£2.28

Gordon reduces his prices by 5%.
Will the total cost of these three items be cheaper in Gordon's shop than in the Supermarket?

(Total for Question 4 is 3 marks)

***8** Sam is going to paint his garden shed.

The paint is sold in two different shops.

Paint For You



£8.35 plus VAT at 20%

Paul's Paints



£3.15

Sam needs **7.5 litres** of paint.

Sam wants to buy the cheapest paint.
He is going to buy the paint from one of these shops.

Which shop should he buy the paint from?
You must show your working.

(Total for Question 8 is 4 marks)

13 Mr and Mrs Adams sold their house for £168 000
They made a profit of 12% on the price they paid for the house.

Calculate how much they paid for the house.

£ .....

(Total for Question 13 is 3 marks)

11 Greg sells car insurance and home insurance.

The table shows the cost of these insurances.

Insurance	car insurance	home insurance
Cost	£200	£350

Each month Greg earns

£530 basic pay
5% of the cost of all the car insurance he sells
and 10% of the cost of all the home insurance he sells

In May Greg sold

6 car insurances
and 4 home insurances

Work out the total amount of money Greg earned in May.

£ .....

(Total for Question 11 is 5 marks)

6 Mr Watkins needs to buy some oil for his central heating.

Mr Watkins can put up to 1500 litres of oil in his oil tank.
There are already 850 litres of oil in the tank.
Mr Watkins is going to fill the tank with oil.

The price of oil is 67.2p per litre.
Mr Watkins gets 5% off the price of the oil.

How much does Mr Watkins pay for the oil he needs to buy?

£.....

(Total for Question 6 is 5 marks)

2 The probability that a pea plant will grow from a seed is 93%.

Sarah plants 800 seeds.

Work out an estimate for the number of seeds that will grow into pea plants.

.....

(Total for Question 2 is 2 marks)

***5** Mr and Mrs Jennings are planning a holiday to Italy.

They will go on holiday with their 11 year old daughter.

The table below shows some information about the prices of flights.

Flight to Italy		Flight back from Italy	
Date	**Price per adult (£)**	**Date**	**Price per adult (£)**
28th October	282	4th November	305
29th October	283	5th November	303
30th October	282	6th November	285
31st October	272	7th November	283
Child fares			
0 to 2 years old	No charge		
Over 2 to 12 years old	75% of the adult fare		

Mr and Mrs Jennings and their daughter want to fly to Italy on 29th October.
They want to fly back from Italy on 6th November.

They have £1600 to spend on flights.
Do they have enough money for the flights?

You must show all your working.

(Total for Question 5 is 6 marks)

6 Bill gives away £20 000 to help animals.

He gives 20% of the £20 000 to a donkey sanctuary.
He shares the rest of the £20 000 between a dogs' home and a cats' home in the ratio 3 : 2

How much money does Bill give to the cats' home?

£.....

(Total for Question 6 is 4 marks)

***8** Zara is the manager of a shop.

The table gives information about the expenses the shop had last year.

Expense	Wages	Rent	Goods	Other expenses
Amount	£92 000	£10 800	£72 000	£7000

This year

the wages will increase by 7.5%,
the rent will be $\frac{7}{9}$ of the rent last year,
the other expenses will halve.

Zara wants to increase the amount of money she spends on goods.

She also wants the total expenses the shop has this year to be the same as last year.

Can Zara increase the amount of money she spends on goods?

(Total for Question 8 is 4 marks)

2 Mr Mason asks 240 Year 11 students what they want to do next year.

15% of the students want to go to college.

$\frac{3}{4}$ of the students want to stay at school.

The rest of the students do not know.

Work out the number of students who do not know.

.....

(Total for Question 2 is 4 marks)

Question 42

16 The normal price of a television is reduced by 30% in a sale.

The sale price of the television is £350

Work out the normal price of the television.

£.....

(Total for Question 16 is 3 marks)

***9** Mr and Mrs Singh are planning a holiday in France.

They want to stay in a hotel or stay in a villa.

If they stay in a hotel, the meals are included in the price.
If they stay in a villa, they will cook their own meals.
The food for their meals will cost £200 each week.

The table gives information about the costs.

Start of holiday	**Hotel (Cost per adult per night)**	**Villa (Cost per week for up to 4 people)**
01 Jan – 28 Feb	£120	£1000
01 Mar – 30 Apr	£125	£1200
01 May – 30 June	£150	£1500
01 July – 31 Aug	£180	£2600
01 Sep – 31 Oct	£150	£1500
Cost for children	40% of adult cost	Included in cost of villa

Mr and Mrs Singh want to go on holiday with their one child on the 3rd of August for one week (7 nights).

Is it cheaper for Mr and Mrs Singh to stay in the hotel or stay in the villa?
You must show all your working.

(Total for Question 9 is 6 marks)

Question 44

1 A ticket to a theme park costs £35 plus 20% VAT.

Work out the total cost of the ticket.

£.....

(Total for Question 1 is 3 marks)

Question 45

3 There are 200 counters in a bag.
The counters are blue or red or yellow.

35% of the counters are blue.

$\frac{1}{5}$ of the counters are red.

Work out the number of yellow counters in the bag.

.....

(Total for Question 3 is 4 marks)

7 Petra booked a family holiday.
The total cost of the holiday was £3500 **plus** VAT at 20%.

Petra paid £900 of the total cost when she booked the holiday.
She paid the rest of the total cost in 6 equal monthly payments.

Work out the amount of each monthly payment.

£.....

(Total for Question 7 is 5 marks)

***10** The diagram shows the floor of a village hall.

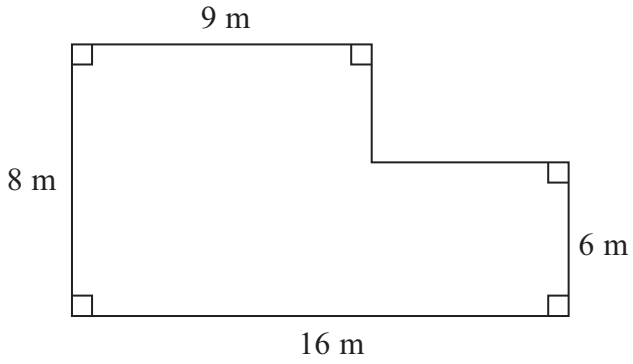


Diagram **NOT** accurately drawn

The caretaker needs to polish the floor.

One tin of polish normally costs £19
One tin of polish covers 12 m^2 of floor.

There is a discount of 30% off the cost of the polish.

The caretaker has £130

Has the caretaker got enough money to buy the polish for the floor?
You must show all your working.

(Total for Question 10 is 5 marks)

11 Each day a company posts some small letters and some large letters.

The company posts all the letters by first class post.

The tables show information about the cost of sending a small letter by first class post and the cost of sending a large letter by first class post.

Small Letter

Weight	First Class Post
0–100 g	60p

Large Letter

Weight	First Class Post
0–100 g	£1.00
101–250 g	£1.50
251–500 g	£1.70
501–750 g	£2.50

One day the company wants to post 200 letters.

The ratio of the number of small letters to the number of large letters is 3 : 2

70% of the large letters weigh 0–100 g.

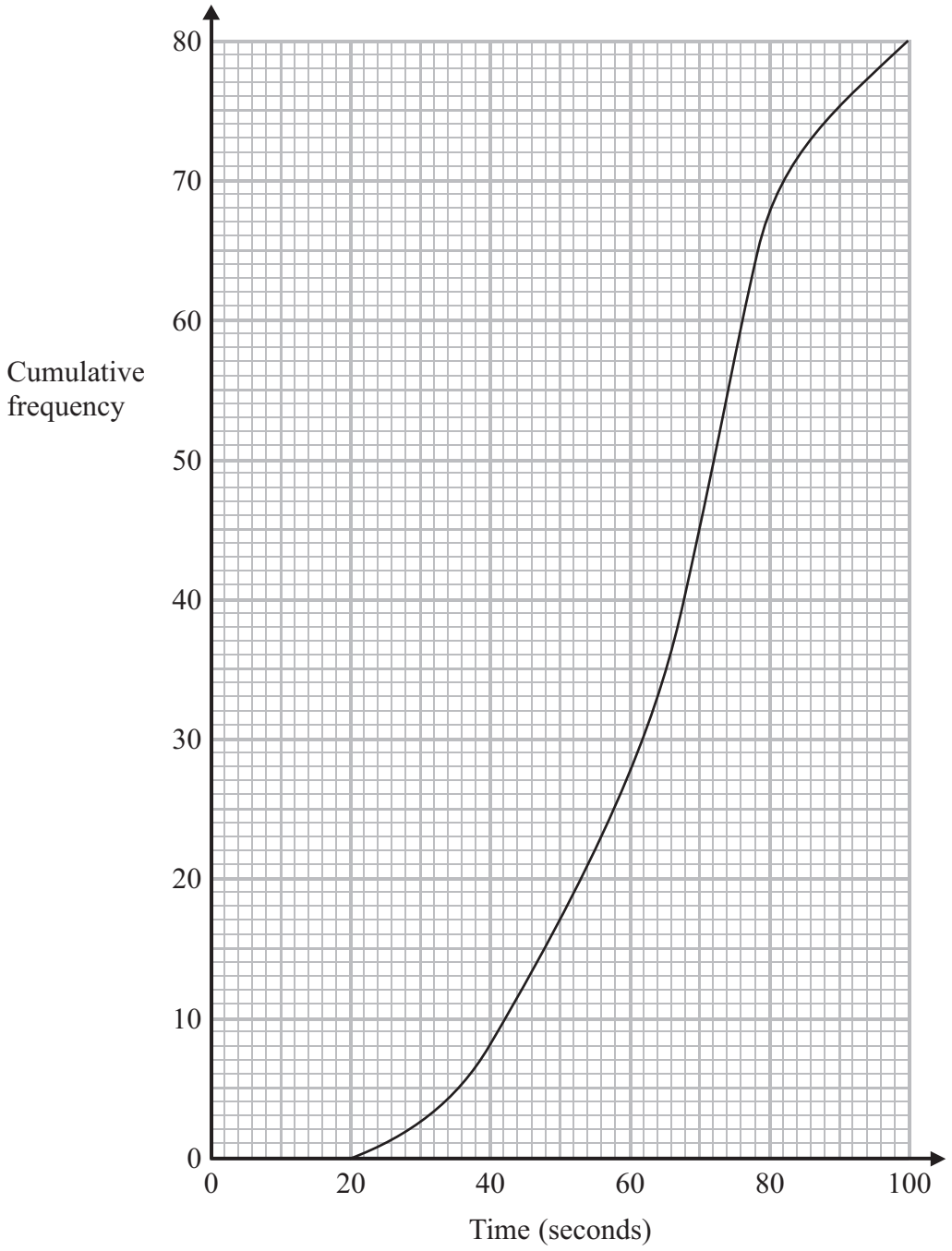
The rest of the large letters weigh 101–250 g.

Work out the total cost of posting the 200 letters by first class post.

£.....

(Total for Question 11 is 5 marks)

18 The cumulative frequency graph shows information about the times 80 swimmers take to swim 50 metres.



(a) Use the graph to find an estimate for the median time.

..... seconds

(1)

A swimmer has to swim 50 metres in 60 seconds or less to qualify for the swimming team.

The team captain says,

"More than 25% of swimmers have qualified for the swimming team."

*(b) Is the team captain right?

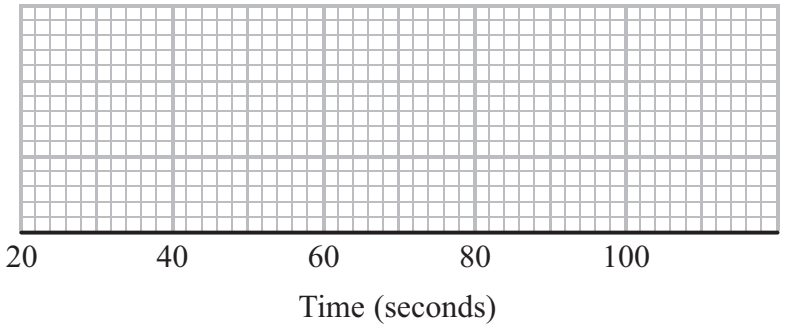
You must show how you got your answer.

(3)

For these 80 swimmers

the least time taken was 28 seconds
and the greatest time taken was 96 seconds.

(c) Use the cumulative frequency graph and the information above to draw a box plot for the times taken by the swimmers.



(3)

(Total for Question 18 is 7 marks)

2 Pavel and Katie share some sweets in the ratio 3 : 8
Katie gets 32 sweets.

(a) How many sweets does Pavel get?

.....

(2)

Katie also has a tin of chocolates.
There are 80 chocolates in the tin.
45% of the chocolates have toffee in the middle.

(b) Work out the number of chocolates that have toffee in the middle.

.....

(2)

(Total for Question 2 is 4 marks)

10 Sasha takes a music exam.

The table shows the result that Sasha can get for different percentages in her music exam.

Percentage	Result
50% – 69%	Pass
70% – 84%	Merit
85% – 100%	Distinction

Sasha gets 62 out of 80 in her music exam.

What result does Sasha get?
You must show your working.

.....

(Total for Question 10 is 3 marks)

20 In a sale normal prices are reduced by 20%.

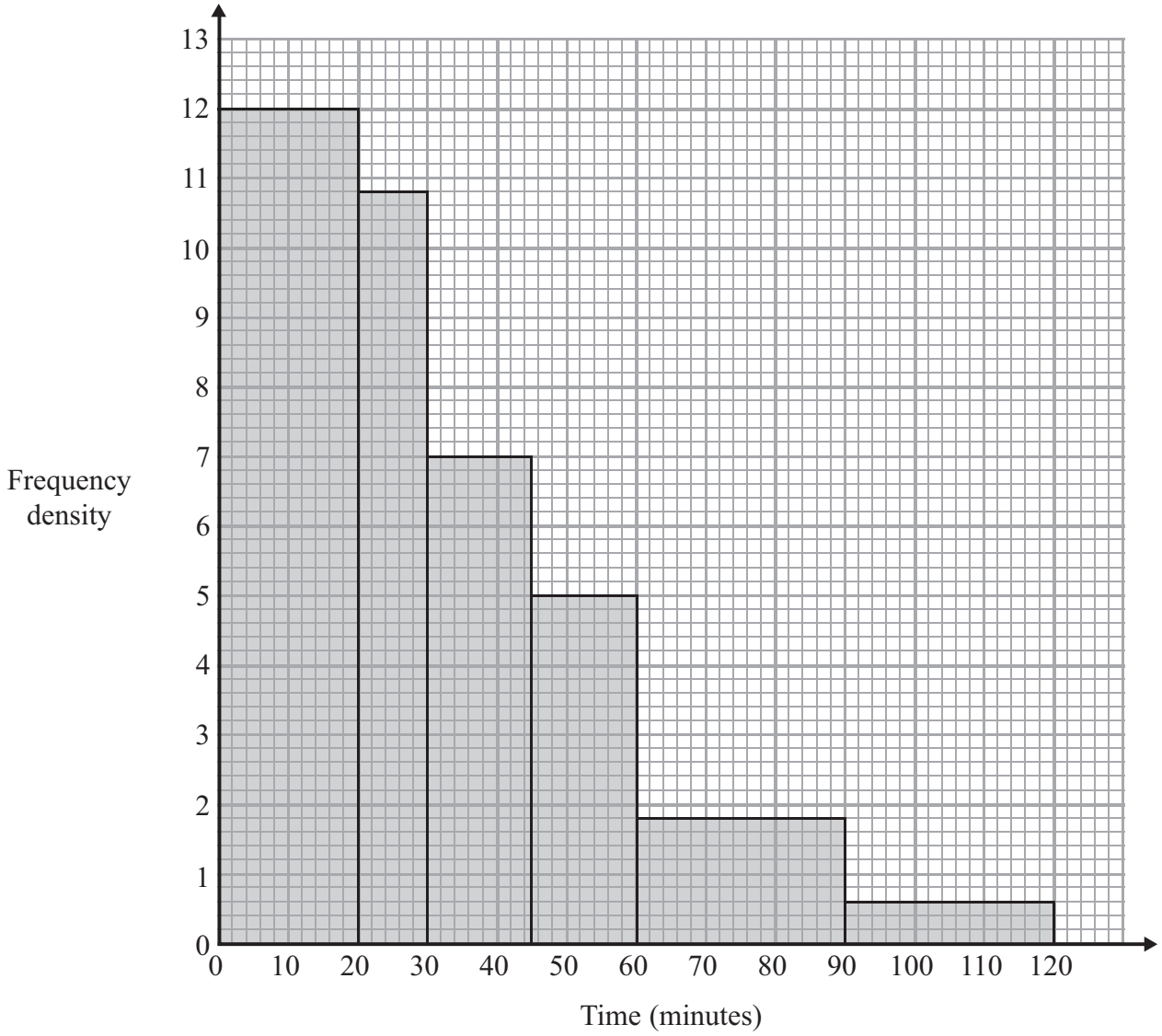
A washing machine has a sale price of £464

By how much money is the normal price of the washing machine reduced?

£ .....

(Total for Question 20 is 3 marks)

27 The histogram shows information about the times, in minutes, that some passengers had to wait at an airport.



Work out the percentage of the passengers who had to wait for more than one hour.

.....

(Total for Question 27 is 3 marks)

*6 The Kumar family are going to go to New York.
They will go with Highway Airlines or Jetstream Airlines.
The tables show how much it costs for each adult and each child to go with these airlines.

Highway Airlines

Date	Adult	Child
4 – 10 July	£475	£280
11 – 17 July	£488	£282
18 – 24 July	£516	£304
25 – 31 July	£506	£297
1 – 7 August	£462	£251
8 – 14 August	£430	£238
15 – 21 August	£421	£235
22 – 28 August	£399	£221

Jetstream Airlines

Date	Adult	Child
4 – 10 July	£483	£286
11 – 17 July	£493	£296
18 – 24 July	£526	£315
25 – 31 July	£519	£303
1 – 7 August	£485	£218
8 – 14 August	£429	£245
15 – 21 August	£409	£232
22 – 28 August	£401	£222

Highway Airlines give a discount of 5% of the total cost for booking online.
Jetstream Airlines give a discount of £25 per person for booking online.

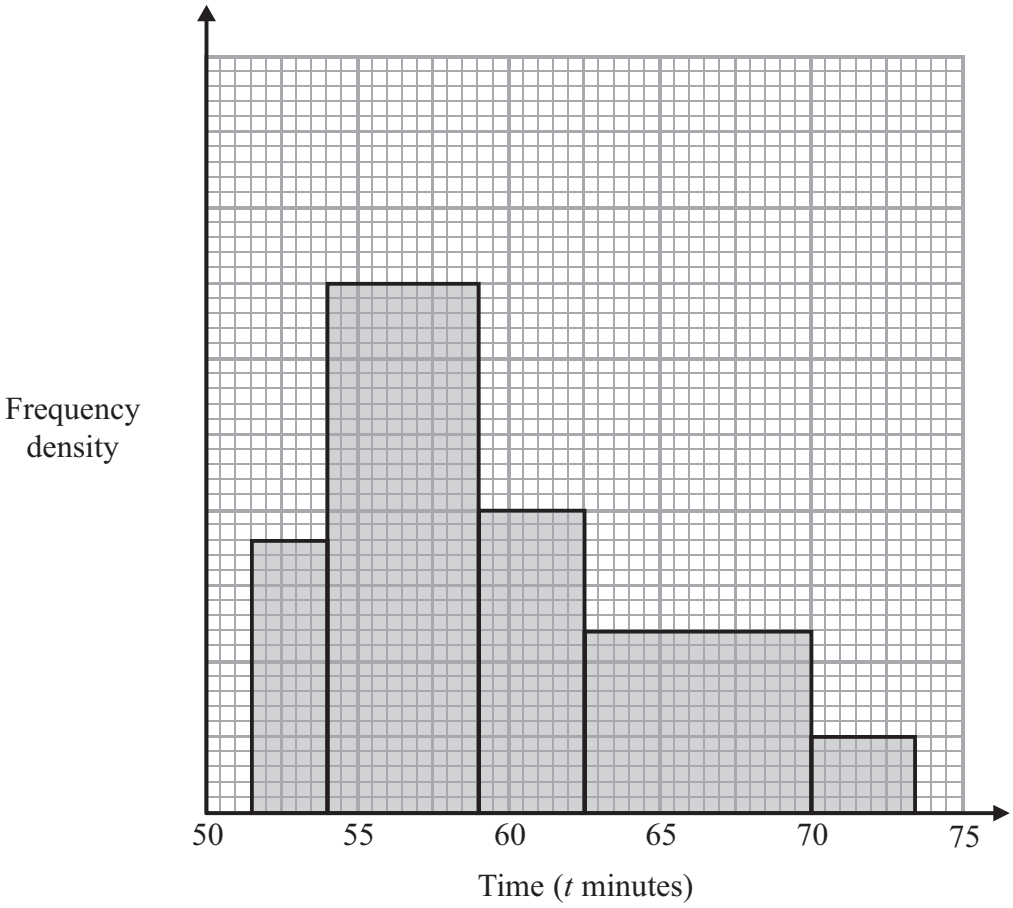
The Kumar family are going to New York on 3 August.
They will buy 2 adult tickets and 1 child ticket.
They will book online.

The Kumar family want to pay the lower total cost.
Which airline should they choose?

(Total for Question 6 is 5 marks)

15 Ulrika recorded the times some people took to run a race.

The histogram gives information about these times.



25% of the people took a time less than T minutes.

Work out an estimate for T.

..... minutes

(Total for Question 15 is 3 marks)

Question 56

2 One day a supermarket has 8420 customers.

65% of the customers pay with a debit card.

$\frac{1}{5}$ of the customers pay with a credit card.

The rest of the customers pay with cash.

Work out how many customers pay with cash.

.....

(Total for Question 2 is 4 marks)

6 Mrs Evans is planning a trip to the zoo.

She finds out this information.

July

M	T	W	T	F	S	S
		1	2	3	4	5
6	7	8	9	10	11	12
13	14	15	16	17	18	19
20	21	22	23	24	25	26
27	28	29	30	31		

Off peak Peak

Ticket Prices

	Peak	Off peak
Adult	£20.50	£19.50
Child	£15.50	£15.00
Senior citizen	£19	£18

Family Offer

10% Discount	2 adults and 2 children or 1 adult and 3 children

Mrs Evans will go to the zoo on Friday 17th July.
She will need to buy tickets for 1 adult and 3 children.

Mrs Evans wants to buy the tickets as cheaply as possible.

Work out the total cost of the tickets.

£ .....

(Total for Question 6 is 4 marks)

Question 58

2 One day a supermarket has 8420 customers.

65% of the customers pay with a debit card.

$\frac{1}{5}$ of the customers pay with a credit card.

The rest of the customers pay with cash.

Work out how many customers pay with cash.

.....

(Total for Question 2 is 4 marks)

6 Mrs Evans is planning a trip to the zoo.

She finds out this information.

July

M	T	W	T	F	S	S
		1	2	3	4	5
6	7	8	9	10	11	12
13	14	15	16	17	18	19
20	21	22	23	24	25	26
27	28	29	30	31		

Off peak Peak

Ticket Prices

	Peak	Off peak
Adult	£20.50	£19.50
Child	£15.50	£15.00
Senior citizen	£19	£18

Family Offer

10% Discount	2 adults and 2 children or 1 adult and 3 children

Mrs Evans will go to the zoo on Friday 17th July.
She will need to buy tickets for 1 adult and 3 children.

Mrs Evans wants to buy the tickets as cheaply as possible.

Work out the total cost of the tickets.

£ .....

(Total for Question 6 is 4 marks)

4 Mr Brown and his 2 children are going to London by train.

An adult ticket costs £24
A child ticket costs £12

Mr Brown has a Family Railcard.

Family Railcard gives

$\frac{1}{3}$ off adult tickets

60% off child tickets

Work out the total cost of the tickets when Mr Brown uses his Family Railcard.

£.....

(Total for Question 4 is 4 marks)

11 Here is a plan of Martin's driveway.

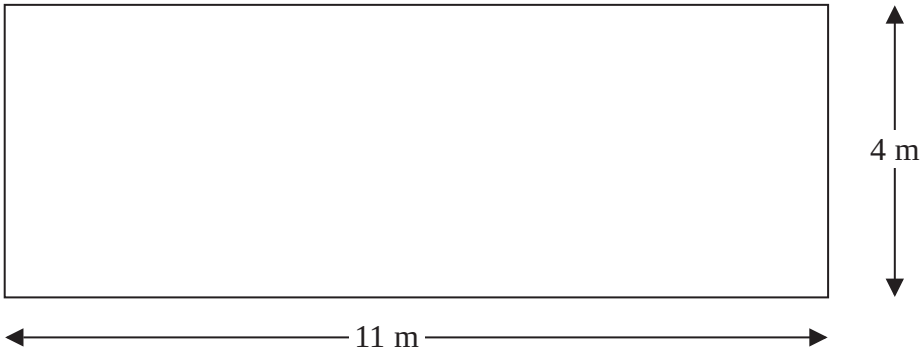


Diagram **NOT** accurately drawn

Martin is going to cover his driveway with gravel.
The gravel will be 6 cm deep.

Gravel is sold in bags.
There are 0.4 m^3 of gravel in each bag.
Each bag of gravel costs £38

Martin gets a discount of 30% off the cost of the gravel.

Work out the total amount of money Martin pays for the gravel.

£.....

(Total for Question 11 is 5 marks)

3 On Monday, a shop sells 120 loaves of bread.

20% of the loaves are wholemeal bread.

$\frac{1}{3}$ of the loaves are granary bread.

The rest of the loaves are white bread.

How many loaves of white bread does the shop sell on Monday?

.....

(Total for Question 3 is 3 marks)

Question 63

1 A set of tyres normally costs £500
In a sale there is a 30% discount.

Work out the sale price of the set of tyres.

£.....

(Total for Question 1 is 3 marks)

1 Glen buys four tickets for a concert.
Each ticket costs £54

Glen also has to pay a booking fee.
The booking fee is 5% of the total price of the tickets.

Work out the total amount Glen has to pay.

£.....

(Total for Question 1 is 3 marks)

Question 65

***2** Karen got 32 out of 80 in a maths test.
She got 38% in an English test.

Karen wants to know if she got a higher percentage in maths or in English.

Did Karen get a higher percentage in maths or in English?

(Total for Question 2 is 2 marks)

11 Ria is going to buy a caravan.
The total cost of the caravan is £7000 **plus** VAT at 20%.

Ria pays a deposit of £3000
She pays the rest of the total cost in 6 equal monthly payments.

Work out the amount of each monthly payment.

£.....

(Total for Question 11 is 4 marks)

16 There are 200 workers at a factory.

The cumulative frequency table gives information about their ages.

Age (a years)	Cumulative frequency
$0 < a \leqslant 20$	25
$0 < a \leqslant 30$	70
$0 < a \leqslant 40$	138
$0 < a \leqslant 50$	175
$0 < a \leqslant 60$	186
$0 < a \leqslant 70$	194
$0 < a \leqslant 80$	200

(a) On the grid opposite, draw a cumulative frequency graph for this information.

(2)

(b) Graham says,

"10% of workers at the factory are older than 65"

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

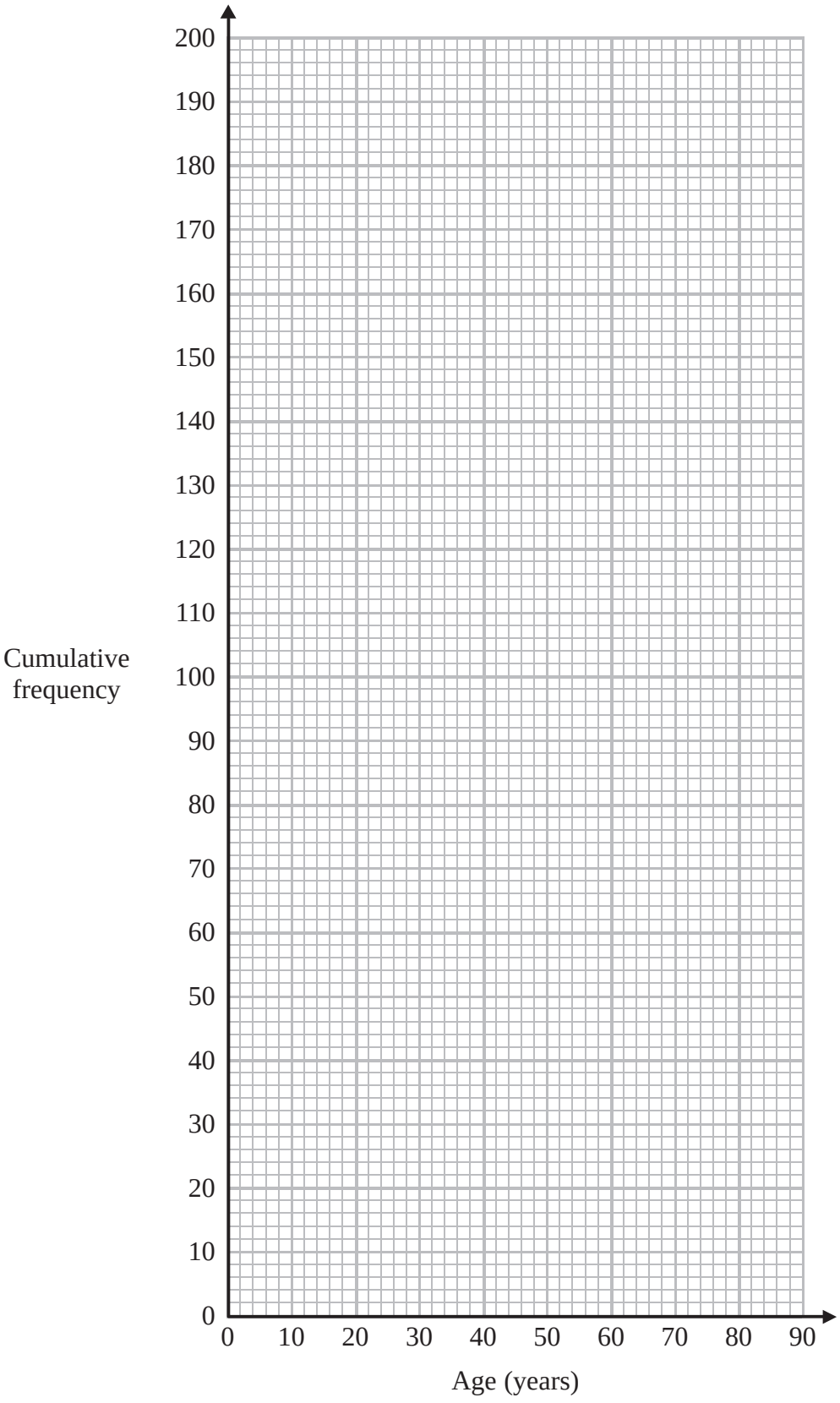
.....

.....

.....

.....

(2)



(Total for Question 16 is 4 marks)

***9** The table gives some information about student attendance at a school on Friday.

	Number of students		
Year	**Present**	**Absent**	**Total**
Year 7	192	16	208
Year 8	219	22	241
Year 9	234	28	262
Year 10	233	28	261
Year 11	214	24	238

The school has a target of 94% of students being present each day.

Did the school meet its target on Friday?

(Total for Question 9 is 3 marks)

4 Tony buys and sells cars.
He has to reach a target of at least 40% profit on each car he sells.

On Monday, Tony buys a car for £1500
On Tuesday, Tony sells the car for £2150

Show that Tony reaches his target for this car.

(Total for Question 4 is 3 marks)

***8**

Nail Company	Hammer Company
50 nails	25 nails
£4.15 plus VAT at 20%	£2.95
	Special offer Buy 100 get 25 free

Barak is going to buy 550 nails from one of these companies.

He wants to buy the nails at the cheaper cost.

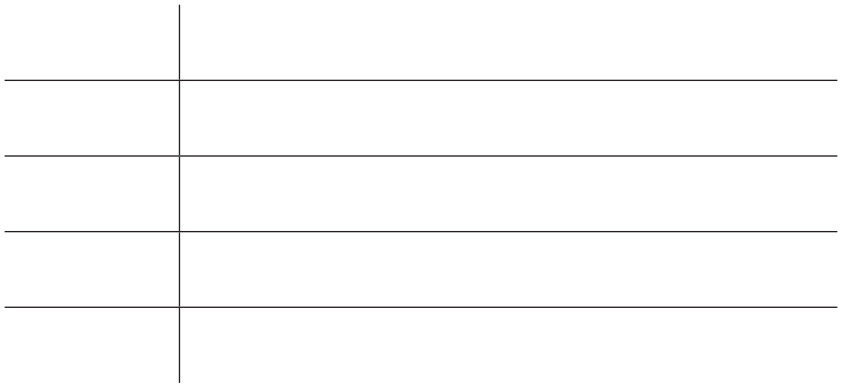
Where should he buy the nails, from the Nail Company or from the Hammer Company?

(Total for Question 8 is 5 marks)

1 Here are the heights in centimetres of 20 men.

165	164	176	179	188	178	183	172	180	190
167	159	156	176	173	168	169	182	167	192

(a) Show this information in an ordered stem and leaf diagram.



(3)

(b) Work out the percentage of these men with a height greater than 184 cm.

..... %

(2)

(Total for Question 1 is 5 marks)

***4** Tom is going to buy 25 plants to make a hedge.

Here is information about the cost of buying the plants.

Kirsty's Plants	**Hedge World**
£2.39 each	Pack of 25 £52.50 plus VAT at 20%

Tom wants to buy the 25 plants as cheaply as possible.

Should Tom buy the plants from Kirsty's Plants or from Hedge World?
You must show all your working.

(Total for Question 4 is 5 marks)

***10** The diagram shows the floor plan of Mary's conservatory.

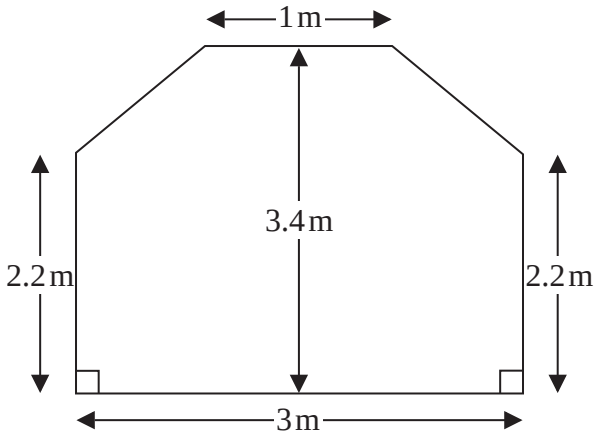


Diagram **NOT** accurately drawn

Mary is going to cover the floor with tiles.

The tiles are sold in packs.
One pack of tiles will cover $2\,m^2$
A pack of tiles normally costs £24.80
Mary gets a discount of 25% off the cost of the tiles.

Mary has £100

Does Mary have enough money to buy all the tiles she needs?
You must show all your working.

(Total for Question 10 is 5 marks)

22 Claire is making a loaf of bread.
A loaf of bread loses 12% of its weight when it is baked.

Claire wants the baked loaf of bread to weigh 1.1 kg.

Work out the weight of the loaf of bread before it is baked.

..... kg

(Total for Question 22 is 3 marks)

5 Kevin wants to get the ferry to Ireland.

A ferry crossing costs

£125 on Saturdays
£109 on Mondays

Kevin has a voucher for 15% off the cost of a ferry crossing on Mondays.

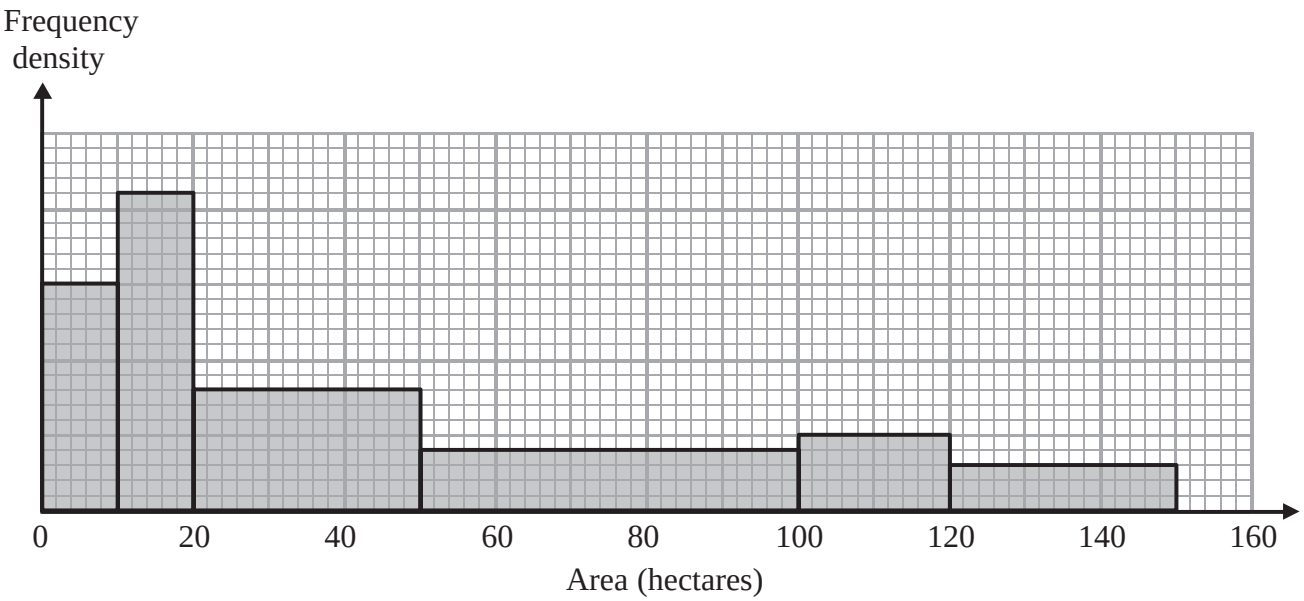
Kevin can go on Saturday without using the voucher or on Monday using the voucher.

What is the difference in the cost of the ferry crossing if Kevin goes on Monday rather than on Saturday?

£.....

(Total for Question 5 is 3 marks)

13 The histogram shows information about the areas of some farms.



90 of the farms have an area of 10 hectares or less.

60% of the farms with an area of 100 hectares or less are arable farms.

$\frac{1}{2}$ of the farms with an area of more than 100 hectares are arable farms.

Work out an estimate for the total number of arable farms.

.....

(Total for Question 13 is 5 marks)

8 Kim invested £2000 for two years.

By the end of the first year, the value of the investment was 15% more than its value at the beginning of the year.

By the end of the second year, the value of the investment was 10% more than its value at the end of the first year.

Work out the value of the investment at the end of the second year.

£.....

(Total for Question 8 is 3 marks)

15 A ball fell 2 metres onto horizontal ground.
The ball hit the ground and bounced up and down 3 times.

The first time the ball bounced, it rose to 75% of the height it fell from.
The second time the ball bounced, it rose to 75% of the height it reached after the first bounce.
The third time the ball bounced, it rose to 75% of the height it reached after the second bounce.

Work out the height the ball reached after the third bounce.
Give your answer correct to 2 decimal places.

..... m

(Total for Question 15 is 3 marks)

Question 79

1 Sean wants to go on holiday.
He is going to get a loan of £720 to help pay for the holiday.

Sean will have to pay back the £720 plus interest of 15%.
He will pay this back in 12 equal monthly installments.

How much money will Sean pay back each month?

£ .....

(Total for Question 1 is 4 marks)

15 Sue works for a company that delivers parcels.

One day the company delivered 80 parcels.
The table shows information about the weights, in kg, of these parcels.

Weight (w kg)	Frequency
$0 < w \leqslant 1$	19
$1 < w \leqslant 2$	17
$2 < w \leqslant 3$	15
$3 < w \leqslant 4$	12
$4 < w \leqslant 5$	10
$5 < w \leqslant 6$	7

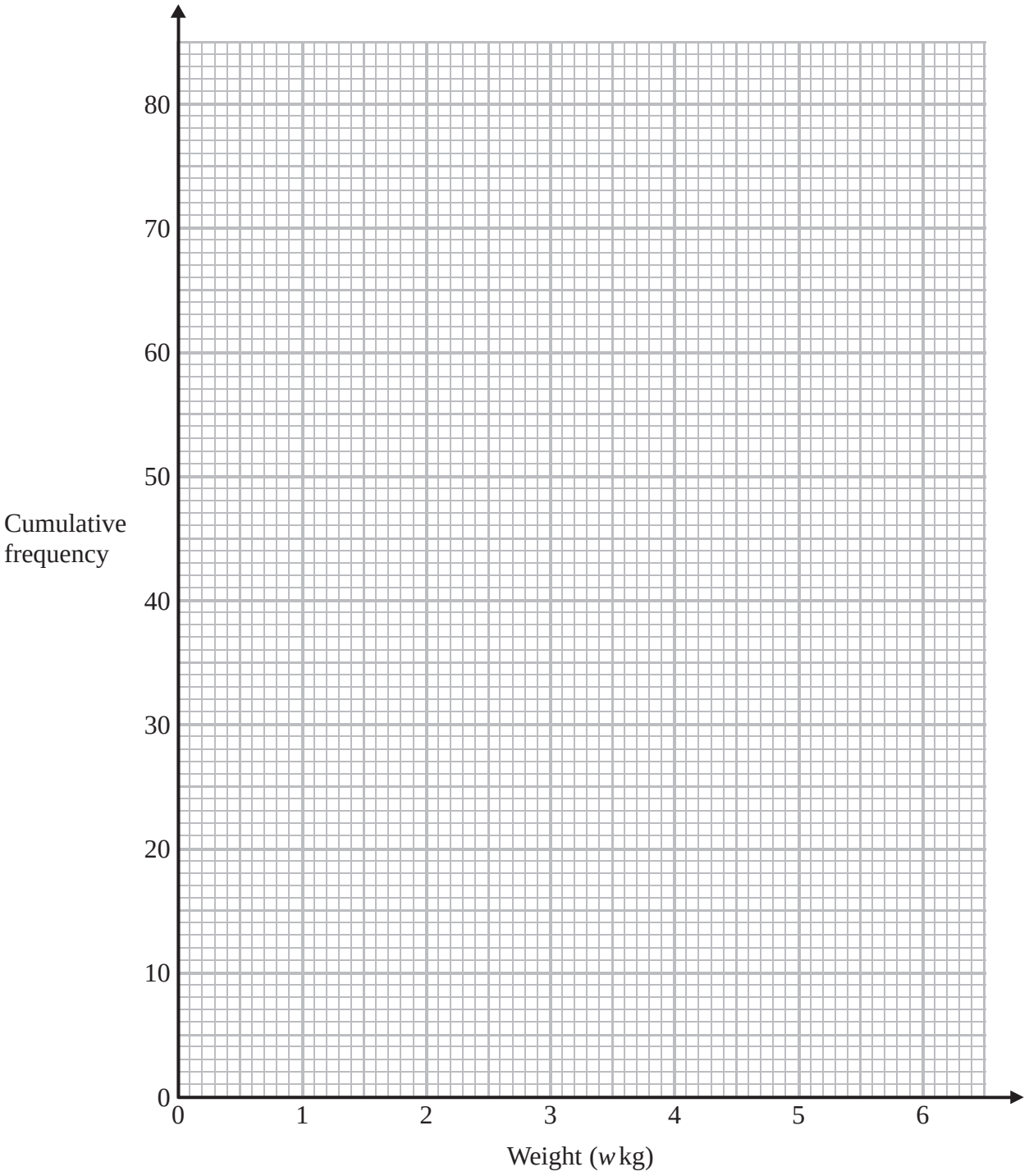
(a) Complete the cumulative frequency table.

Weight (w kg)	Cumulative frequency
$0 < w \leqslant 1$	
$0 < w \leqslant 2$	
$0 < w \leqslant 3$	
$0 < w \leqslant 4$	
$0 < w \leqslant 5$	
$0 < w \leqslant 6$	

(1)

(b) On the grid opposite, draw a cumulative frequency graph for your table.

(2)



Sue says,

"75% of the parcels weigh less than 3.4 kg."

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

(3)

(Total for Question 15 is 6 marks)

5 Celina and Zoe both sing in a band.

One evening the band plays for 80 minutes.
Celina sings for 65% of the 80 minutes.

Zoe sings for $\frac{5}{8}$ of the 80 minutes.

Celina sings for more minutes than Zoe sings.

Work out for how many more minutes.
You must show all your working.

..... minutes

(Total for Question 5 is 4 marks)

14 Each year Wenford Hospital records how long patients wait to be treated in the Accident and Emergency department.

In 2015 patients waited 11% less time than in 2014
In 2015 the average time patients waited was 68 minutes.

(a) Work out the average time patients waited in 2014
Give your answer to the nearest minute.

..... minutes
(3)

The hospital has a target to reduce the average time patients wait to be treated in the Accident and Emergency department to 60 minutes in 2016

(b) Work out the percentage decrease from 68 minutes to 60 minutes.

.....%
(2)

(Total for Question 14 is 5 marks)

4 Mr and Mrs Jones are planning a trip to Colwyn for a day.
There will be two adults and three children on the trip.

They are going from Crewe.
They must be back in Crewe by 7.30 pm.

They buy the cheapest possible tickets for the day trip.

A child ticket is 30% of the price of an adult ticket.

The tables show part of the train timetable between Crewe and Colwyn.
They also show the price of an adult ticket.

Crewe	0723	0823	0849	0923	0949	1023	1049
Colwyn	0850	0943	1016	1034	1104	1148	1200
Price per adult	£25.20	£25.20	£25.20	£25.20	£25.20	£24.00	£24.00

Colwyn	1527	1646	1737	1832	1853	1925	1951
Crewe	1654	1754	1918	1954	2018	2038	2129
Price per adult	£22.00	£22.00	£22.00	£22.00	£18.50	£18.50	£18.50

The family want to be in Colwyn for as long as possible.

*(a) Plan a schedule for the day trip.
You must show the times of both their train journeys.
Write down how long they can spend in Colwyn.

(4)

A child ticket is 30% of the price of an adult ticket.

(b) Calculate the total cost of the train tickets for the Jones family.

£.....

(3)

(Total for Question 4 is 7 marks)

13 Kristen buys a laptop.

She gets a discount of 20% off the normal price.
Kristen pays £480 for the laptop.

Work out the discount.
Give your answer in pounds.

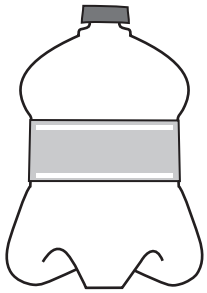
£ .....

(Total for Question 13 is 3 marks)

***3** A supermarket has two special offers on lemonade.

Bottles of lemonade

Special offer



15% off the normal price of each bottle

Cans of lemonade

Special offer



Buy 3 cans get 25p off the total cost

The normal price of a 2.5 litre bottle of lemonade is £1.60
The normal price of a 0.33 litre can of lemonade is 28p.

Jerry is going to buy 4 bottles of the lemonade on special offer or 30 cans of the lemonade on special offer.

Which special offer is the better value for money?

(Total for Question 3 is 5 marks)

13 The table gives information about Ali's spending last month.

Item	Percentage of total spending
rent	30%
food	15%
transport	12%
other	43%

Ali's total spending last month was £800

Next month Ali's rent, in pounds, is going to rise by 20%.
His total spending will still be the same.

Express the amount of money Ali will spend on rent next month as a percentage of £800

.....%

(Total for Question 13 is 3 marks)

6 The body mass index, B, for a person of mass m kg and height h metres is given by the formula

$$B = \frac{m}{h^2}$$

Usman has a mass of 50 kg.
He has a height of 1.57 m.

(a) Work out Usman's body mass index.
Give your answer correct to one decimal place.

.....
(2)

Tom's height is 1.80 m.
He wants his body mass index to be 21

(b) Work out the mass that will give Tom a body mass index of 21

..... kg
(2)

Tom is a ski jumper.

The maximum length of skis he can use is 145% of his height.
Tom's height is 1.80 m.

(c) Work out the maximum length of skis Tom can use.

..... m
(3)

(Total for Question 6 is 7 marks)

Question 88

1 Sally has £520
Katie has £360

Sally and Katie are each going to give 15% of their money to charity.

Work out the total amount of money they give to charity.

£.....

(Total for Question 1 is 3 marks)

7 Bhavin buys a car in a sale.

Before the sale, the cost of the car was £6720
In the sale, the cost of every car is reduced by 20%.

Bhavin pays a deposit of £1500
He will pay the rest of the cost in 24 equal monthly payments.

Work out the amount of each monthly payment.
You must show all your working.

£ .....

(Total for Question 7 is 5 marks)

***14** During a 10 year period, the number of people living in Sherbury increased by 5% to 20 265

In the same period, the number of people living in Yaston increased by 7.5% to 13 502

Compare the increase in the number of people living in Sherbury with the increase in the number of people living in Yaston during this 10 year period.

(Total for Question 14 is 3 marks)

***8** Two shops, Mega Bathrooms and Bathroom Mart, each have a sale.

Mega Bathrooms	**Bathroom Mart**
Sale 60% off normal price **then** 15% off	Sale $\frac{2}{3}$ off normal price

Sally wants to buy some bathroom units.
The units have a normal price of £1500

Sally wants to buy the units as cheaply as possible.

Which shop should she buy the units from?
You must show all your working.

(Total for Question 8 is 4 marks)

13 Charlotte grows some potatoes.

The table shows information about the weights of her potatoes.

Weight (w grams)	Frequency
$100 < w \leqslant 120$	5
$120 < w \leqslant 140$	25
$140 < w \leqslant 160$	30
$160 < w \leqslant 180$	15
$180 < w \leqslant 200$	5

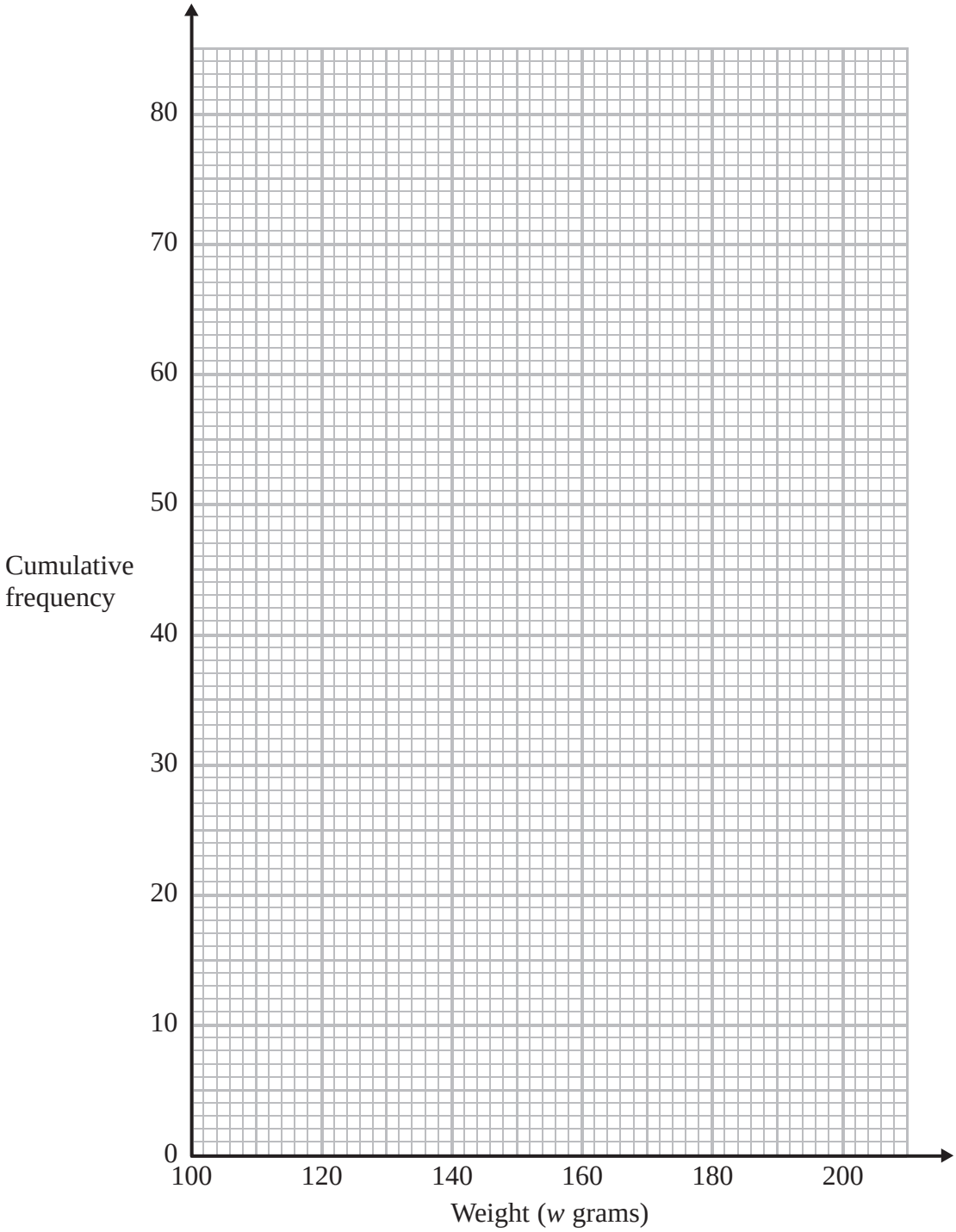
(a) Complete the cumulative frequency table.

Weight (w grams)	Cumulative frequency
$100 < w \leqslant 120$	
$100 < w \leqslant 140$	
$100 < w \leqslant 160$	
$100 < w \leqslant 180$	
$100 < w \leqslant 200$	

(1)

(b) On the grid opposite, draw a cumulative frequency graph for your table.

(2)



(c) Use your graph to find an estimate for the interquartile range.

..... grams

(2)

(d) Use your graph to find an estimate for the percentage of Charlotte's potatoes with a weight less than 150 grams.

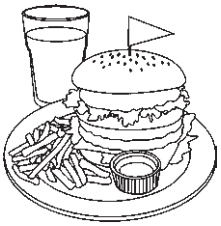
..... %

(3)

(Total for Question 13 is 8 marks)

***6** Fraya is planning a chess competition.

Here are the costs.

Prizes	**Food and drink**	**Room**
First prize £50 Second prize £25 Third prize £15	 £225	£168 15% discount on Saturdays.

The competition will be on a Saturday.

There will be 48 players in the competition.
Each player will pay an entry fee of £9.50

Will Fraya get enough money from the entry fees to pay all the costs?
You must show your working.

(Total for Question 6 is 5 marks)

3 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 3 is 4 marks)

Question 95

1 Jane bought a house for £60 000
She then sold the house for a profit of 12%.

Work out how much Jane sold the house for.

£.....

(Total for Question 1 is 2 marks)

Question 96

***9** The normal price of a watch is £80 in two shops, Tymes and Sekonds.

Both shops have a sale.

In Tymes the normal price of the watch is reduced by £18
In Sekonds the normal price of the watch is reduced by 20%

Which shop is selling the watch for the cheaper price in the sale?
You must show your working.

(Total for Question 9 is 3 marks)

***2** Bill buys and sells laptops.

Last month Bill bought 50 laptops.
He paid £400 for each laptop.

He sold
40 of these laptops at a profit of 30% on each laptop
10 of these laptops at a profit of 15% on each laptop

Bill's target last month was to sell all 50 laptops for a total of at least £25 000

Did Bill reach this target?

(Total for Question 2 is 5 marks)

Question 98

2 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.

.....

(Total for Question 2 is 3 marks)

6 George wants to watch all 23 games that a football team will play at home next season.

He can buy

a season ticket costing £425

or 23 separate tickets costing £24 each ticket.

What percentage of the total cost of 23 separate tickets does George save by buying a season ticket?

.....%

(Total for Question 6 is 3 marks)

Question 100

9 Jules buys a washing machine.

20% VAT is added to the price of the washing machine.
Jules then has to pay a total of £600

What is the price of the washing machine with **no** VAT added?

£.....

(Total for Question 9 is 2 marks)

2 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.

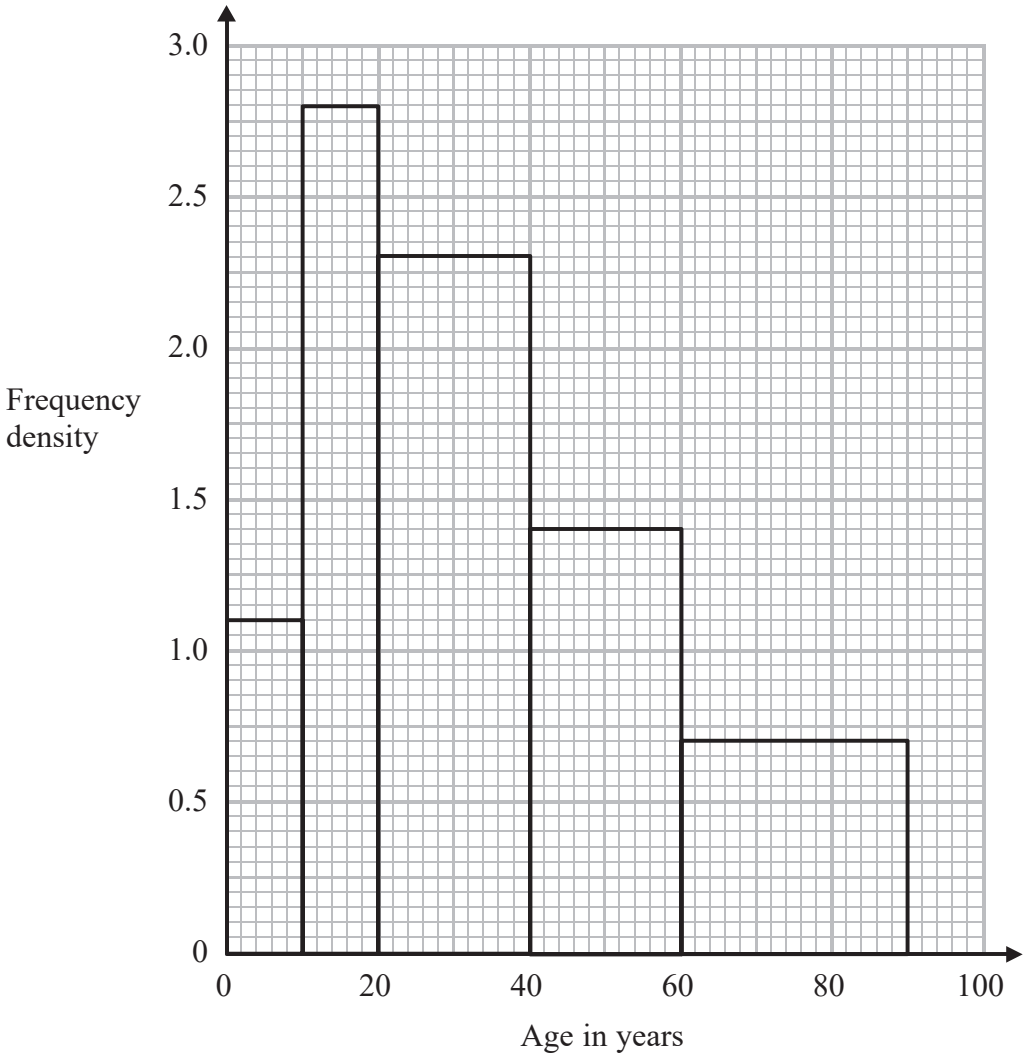
$\frac{3}{4}$ of the children had seats in the Stalls.
117 children had seats in the Circle.

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 2 is 5 marks)

13 The histogram shows some information about the ages of the 134 members of a sports club.



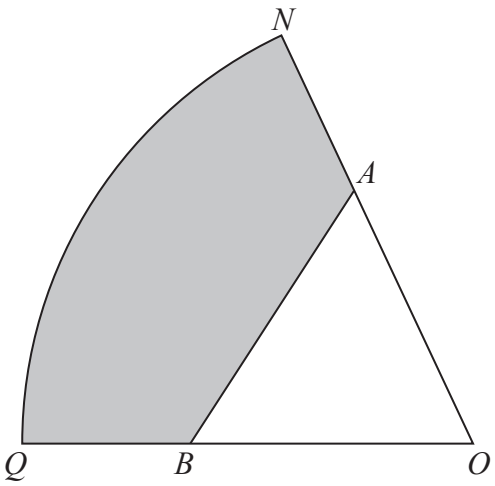
20% of the members of the sports club who are over 50 years of age are female.

Work out an estimate for the number of female members who are over 50 years of age.

.....

(Total for Question 13 is 3 marks)

17



ONQ is a sector of a circle with centre *O* and radius 11 cm.

A is the point on *ON* and *B* is the point on *OQ* such that *AOB* is an equilateral triangle of side 7 cm.

Calculate the area of the shaded region as a percentage of the area of the sector *ONQ*.
Give your answer correct to 1 decimal place.

.....%

(Total for Question 17 is 5 marks)

4 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 4 is 5 marks)

Question 105

November 2017 | 1MA1/2H | Original Q2

2 Emily buys a pack of 12 bottles of water.
The pack costs £5.64

Emily sells all 12 bottles for 50p each.

Work out Emily's percentage profit.
Give your answer correct to 1 decimal place.

.....%

(Total for Question 2 is 3 marks)

Question 106

November 2017 | 1MA1/2H | Original Q18

18 At time $t = 0$ hours a tank is full of water.

Water leaks from the tank.
At the end of every hour there is 2% less water in the tank than at the start of the hour.

The volume of water, in litres, in the tank at time t hours is V_t

Given that

$$V_0 = 2000$$
$$V_{t+1} = kV_t$$

write down the value of k.

$k =$ .....

(Total for Question 18 is 1 mark)

9 Jack bought a new boat for £12 500

The value, £V, of Jack's boat at the end of n years is given by the formula

$$V = 12\,500 \times (0.85)^n$$

(a) At the end of how many years was the value of Jack's boat first less than 50% of the value of the boat when it was new?

.....

(2)

A savings account pays interest at a rate of R% per year.
Jack invests £5500 in the account for one year.

At the end of the year, Jack pays tax on the interest at a rate of 40%.
After paying tax, he gets £79.20

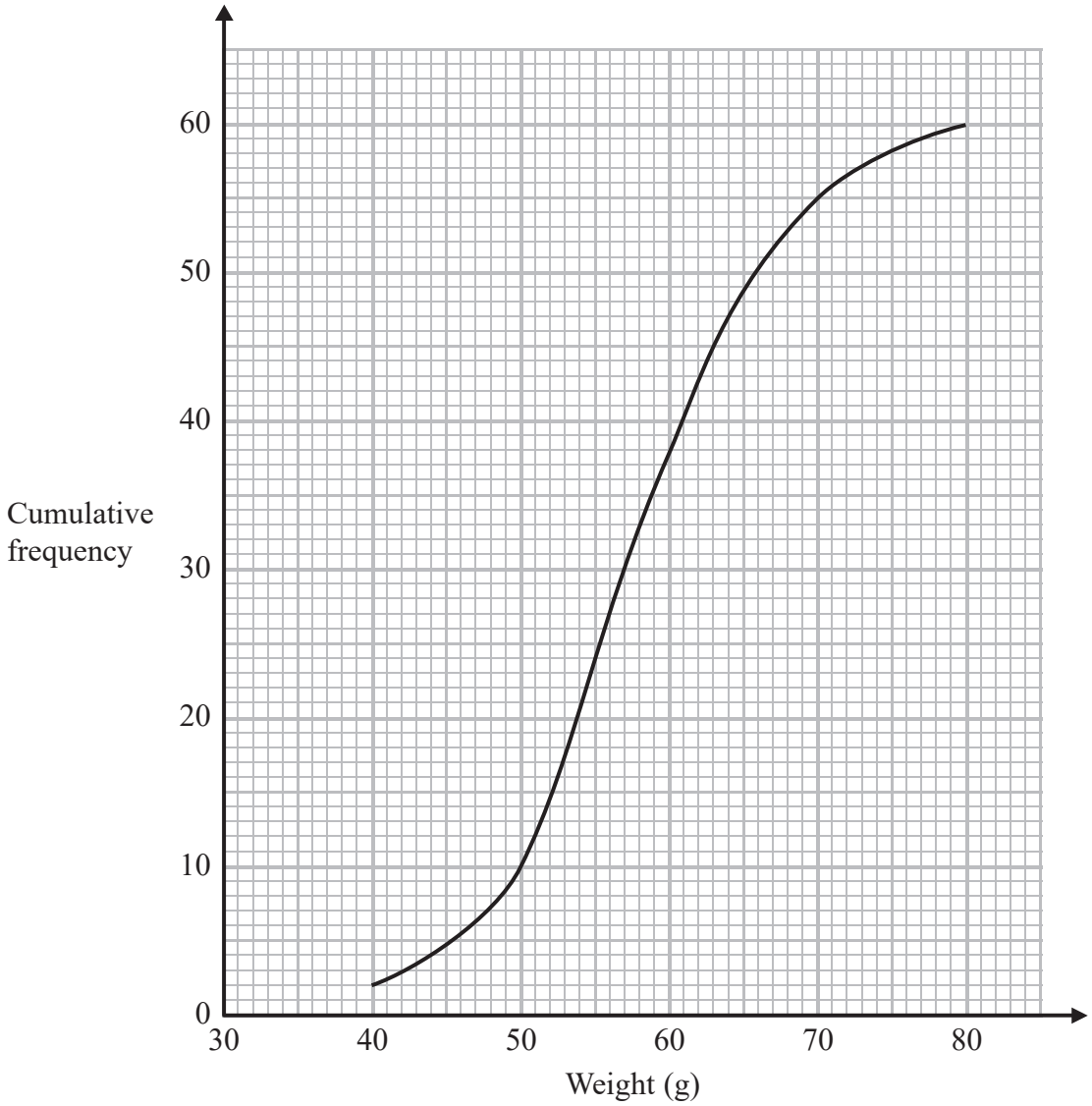
(b) Work out the value of R.

.....

(3)

(Total for Question 9 is 5 marks)

11 The cumulative frequency graph shows information about the weights of 60 potatoes.



(a) Use the graph to find an estimate for the median weight.

..... g

(1)

Jamil says,

"80 − 40 = 40 so the range of the weights is 40 g."

(b) Is Jamil correct?
You must give a reason for your answer.

.....

.....

(1)

(c) Show that less than 25% of the potatoes have a weight greater than 65 g.

(2)

(Total for Question 11 is 4 marks)

Question 109

3 Renee buys 5 kg of sweets to sell.
She pays £10 for the sweets.

Renee puts all the sweets into bags.
She puts 250 g of sweets into each bag.
She sells each bag of sweets for 65p.

Renee sells all the bags of sweets.

Work out her percentage profit.

.....%

(Total for Question 3 is 4 marks)

4 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 4 is 5 marks)

6 A force of 70 newtons acts on an area of $20\,cm^2$

$$\text{pressure} = \frac{\text{force}}{\text{area}}$$

The force is increased by 10 newtons.
The area is increased by $10\,cm^2$

Helen says,

"The pressure decreases by less than 20%"

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

(Total for Question 6 is 3 marks)

Question 112

9 $T = \sqrt{\frac{w}{d^3}}$

$w = 5.6 \times 10^{-5}$
$d = 1.4 \times 10^{-4}$

(a) Work out the value of T.
Give your answer in standard form correct to 3 significant figures.

$T =$ .....

(2)

w is increased by 10%
d is increased by 5%

Lottie says,

"The value of T will increase because both w and d are increased."

(b) Lottie is wrong.
Explain why.

.....

.....

(2)

(Total for Question 9 is 4 marks)

Question 113

11 In 2003, Jerry bought a house.

In 2007, Jerry sold the house to Mia.
He made a profit of 20%

In 2012, Mia sold the house for £162 000
She made a loss of 10%

Work out how much Jerry paid for the house in 2003

£.....

(Total for Question 11 is 3 marks)

3 A bonus of £2100 is shared by 10 people who work for a company.
40% of the bonus is shared equally between 3 managers.
The rest of the bonus is shared equally between 7 salesmen.

One of the salesmen says,

"If the bonus is shared equally between all 10 people I will get 25% more money."

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

(Total for Question 3 is 5 marks)

11 Jack and Sadia work for a company that sells boxes of breakfast cereal.

The company wants to have a special offer.

Here is Jack's idea for the special offer.

> Put 25% more cereal into each box and do **not** change the price.

Here is Sadia's idea.

> Reduce the price and do **not** change the amount of cereal in each box.

Sadia wants her idea to give the same value for money as Jack's idea.

By what percentage does she need to reduce the price?

..... %

(Total for Question 11 is 3 marks)

Question 116

10 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 10 is 5 marks)

Question 117

November 2018 | 1MA1/3H | Original Q2

2 Last year Jo paid £245 for her car insurance.
This year she has to pay £883 for her car insurance.

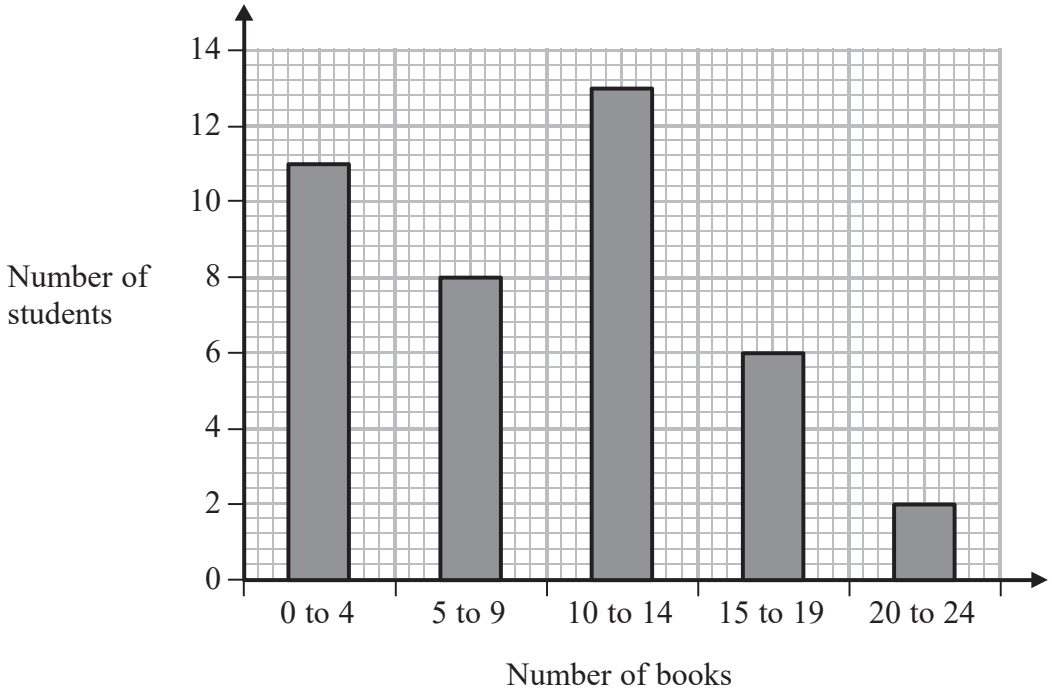
Work out the percentage increase in the cost of her car insurance.

.....%

(Total for Question 2 is 3 marks)

4 Fran asks each of 40 students how many books they bought last year.

The chart below shows information about the number of books bought by each of the 40 students.



(a) Work out the percentage of these students who bought 20 or more books.

.....%

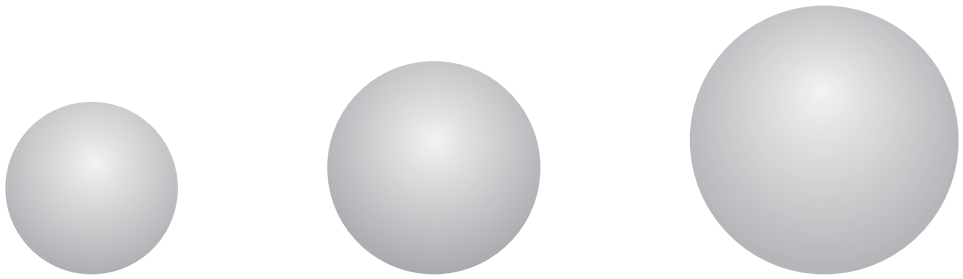
(2)

(b) Show that an estimate for the mean number of books bought is 9.5
You must show all your working.

(4)

(Total for Question 4 is 6 marks)

12 Here are three spheres.



P **Q** **R**

The volume of sphere **Q** is 50% more than the volume of sphere **P**.
The volume of sphere **R** is 50% more than the volume of sphere **Q**.

Find the volume of sphere **P** as a fraction of the volume of sphere **R**.

.....

(Total for Question 12 is 3 marks)

9 The circumference of circle **B** is 90% of the circumference of circle **A**.

(a) Find the ratio of the area of circle **A** to the area of circle **B**.

.....

(2)

Square **E** has sides of length e cm.
Square **F** has sides of length f cm.

The area of square **E** is 44% greater than the area of square **F**.

(b) Work out the ratio $e : f$

.....

(2)

(Total for Question 9 is 4 marks)

11 The grouped frequency table gives information about the times, in minutes, that 80 office workers take to get to work.

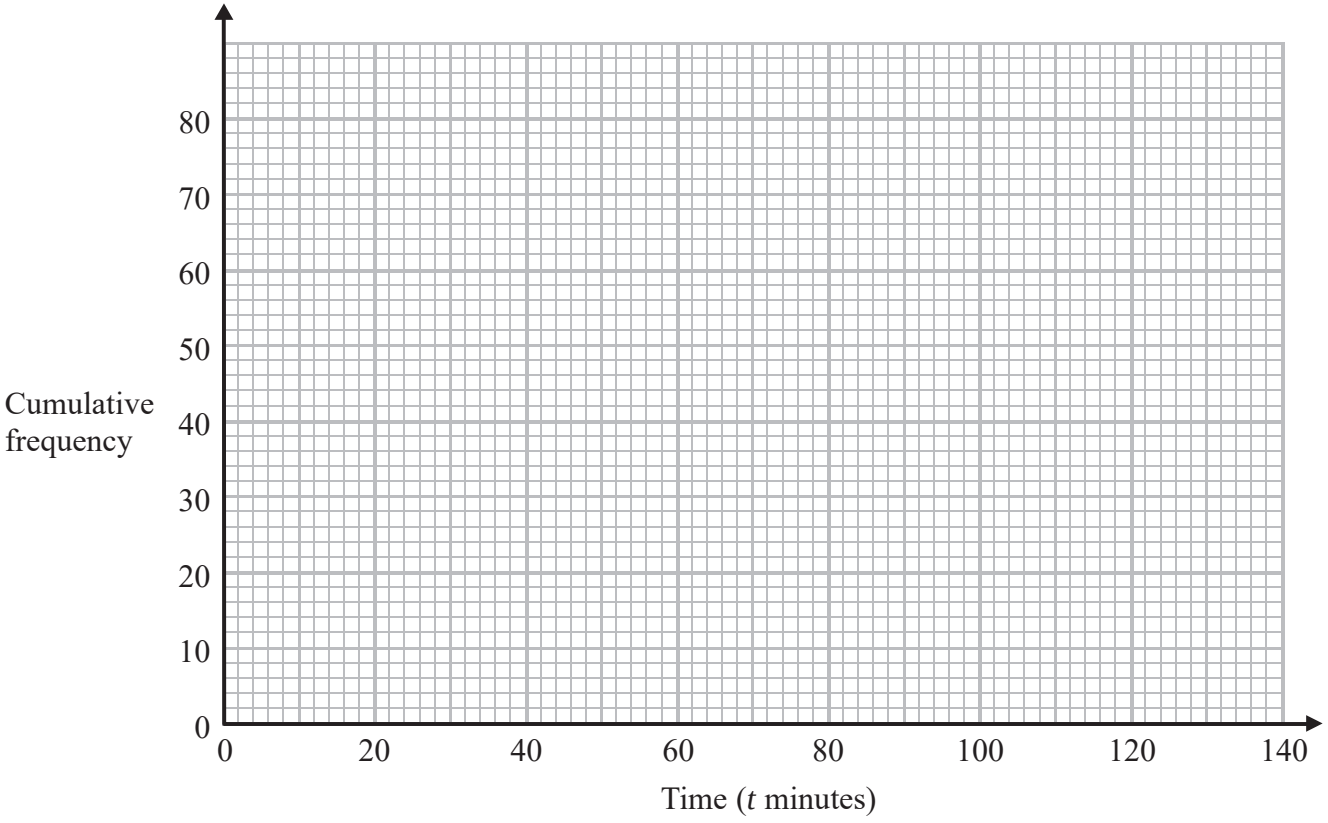
Time (t minutes)	Frequency
$0 < t \leqslant 20$	5
$20 < t \leqslant 40$	30
$40 < t \leqslant 60$	20
$60 < t \leqslant 80$	15
$80 < t \leqslant 100$	8
$100 < t \leqslant 120$	2

(a) Complete the cumulative frequency table.

Time (t minutes)	Cumulative frequency
$0 < t \leqslant 20$	
$0 < t \leqslant 40$	
$0 < t \leqslant 60$	
$0 < t \leqslant 80$	
$0 < t \leqslant 100$	
$0 < t \leqslant 120$	

(1)

(b) On the grid, draw the cumulative frequency graph for this information.



(2)

(c) Use your graph to find an estimate for the percentage of these office workers who take more than 90 minutes to get to work.

.....%

(3)

(Total for Question 11 is 6 marks)

Question 122

10 Marie invests £8000 in an account for one year.
At the end of the year, interest is added to her account.

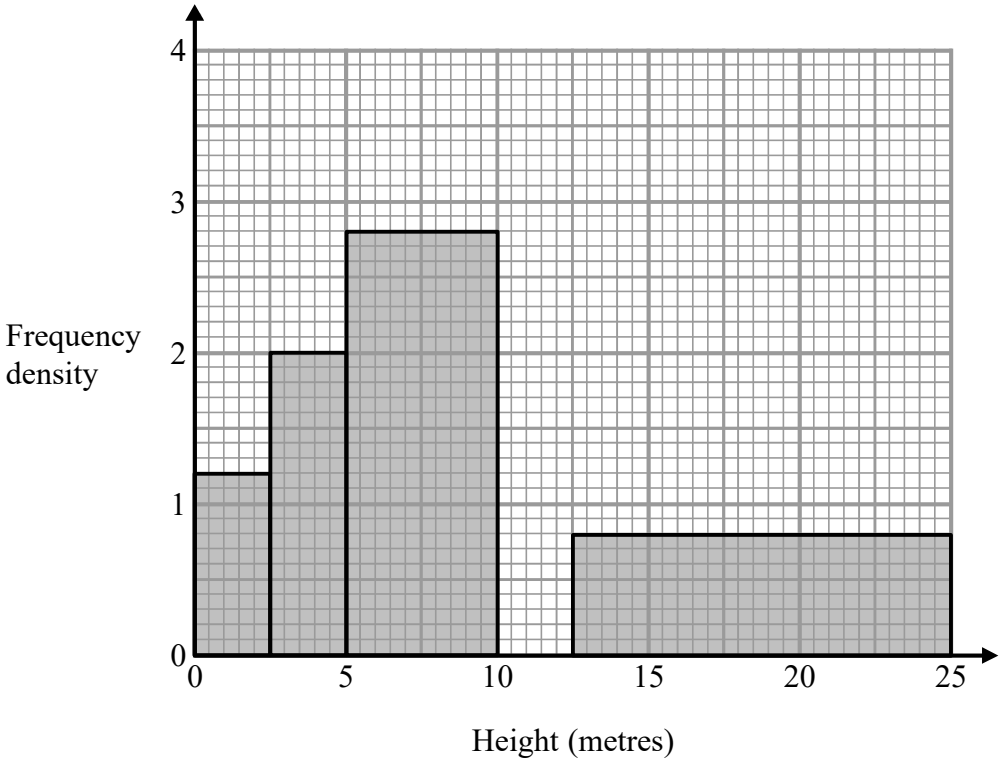
Marie pays tax on this interest at a rate of 20%
She pays £28.80 tax.

Work out the percentage interest rate for the account.

..... %

(Total for Question 10 is 3 marks)

18 The histogram gives information about the heights, in metres, of the trees in a park.
The histogram is incomplete.



20% of the trees in the park have a height between 10 metres and 12.5 metres.
None of the trees in the park have a height greater than 25 metres.

Complete the histogram.

(Total for Question 18 is 3 marks)

Question 124

5 Sean pays £10 for 24 chocolate bars.

He sells all 24 chocolate bars for 50p each.

Work out Sean's percentage profit.

..... %

(Total for Question 5 is 3 marks)

12 The table gives information about the weekly wages of 80 people.

Wage (£w)	Frequency
$200 < w \leqslant 250$	5
$250 < w \leqslant 300$	10
$300 < w \leqslant 350$	20
$350 < w \leqslant 400$	20
$400 < w \leqslant 450$	15
$450 < w \leqslant 500$	10

(a) Complete the cumulative frequency table.

Wage (£w)	Cumulative frequency
$200 < w \leqslant 250$	
$200 < w \leqslant 300$	
$200 < w \leqslant 350$	
$200 < w \leqslant 400$	
$200 < w \leqslant 450$	
$200 < w \leqslant 500$	

(1)

(b) On the grid opposite, draw a cumulative frequency graph for your completed table.

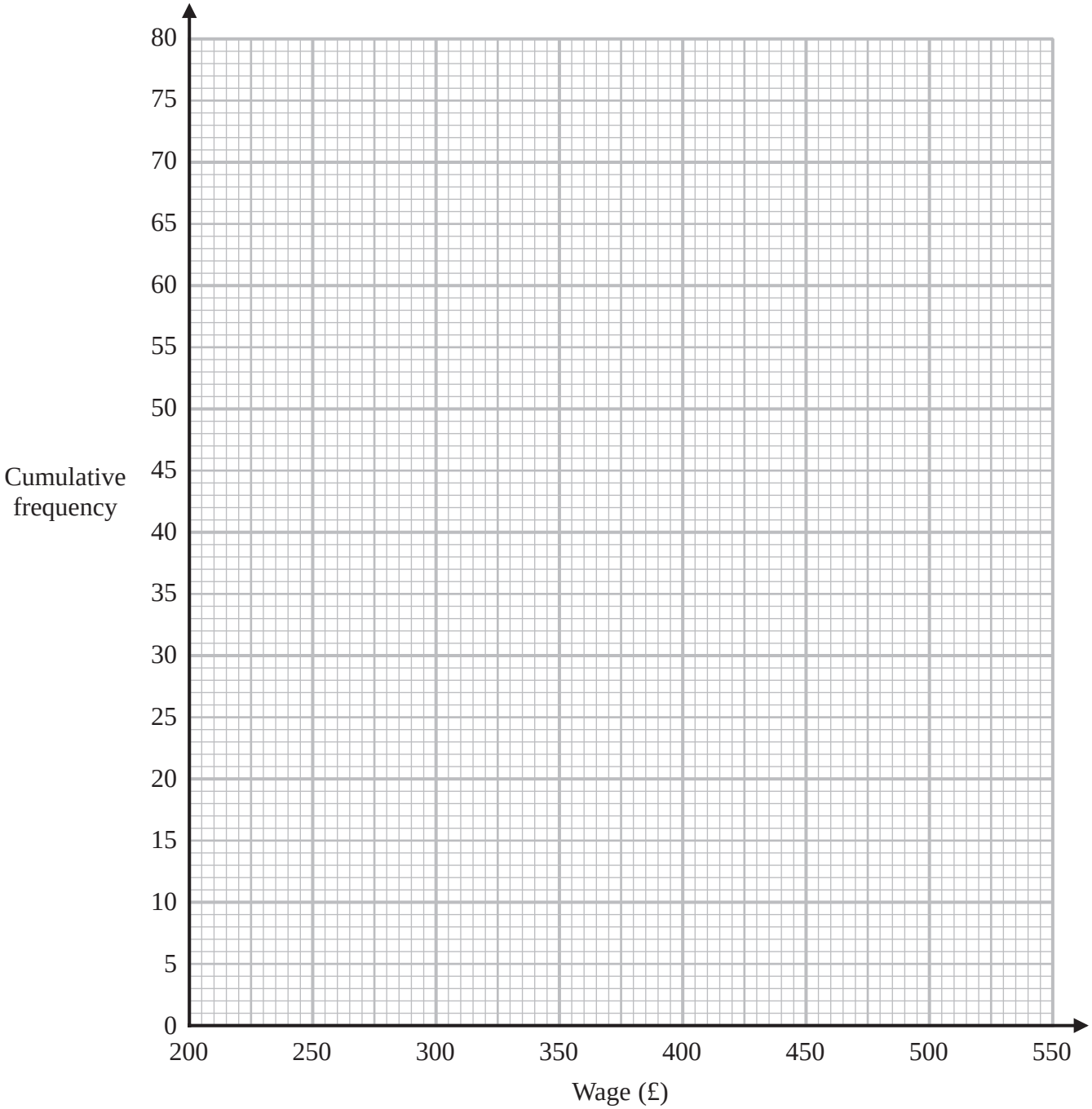
(2)

Juan says

"60% of this group of people have a weekly wage of £360 or less."

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

(3)



(Total for Question 12 is 6 marks)

Question 126

November 2020 | 1MA1/1H | Original Q18

18 x is proportional to $\sqrt{y}$ where $y > 0$

y is increased by 44%

Work out the percentage increase in x.

.....%

(Total for Question 18 is 3 marks)

3 Carlo puts tins into small boxes and into large boxes.

He puts 6 tins into each small box.
He puts 20 tins into each large box.

Carlo puts a total of 3000 tins into the boxes so that

number of tins in small boxes : number of tins in large boxes = 2 : 3

Carlo says that less than 30% of the boxes filled with tins are large boxes.

Is Carlo correct?
You must show all your working.

(Total for Question 3 is 5 marks)

Question 128

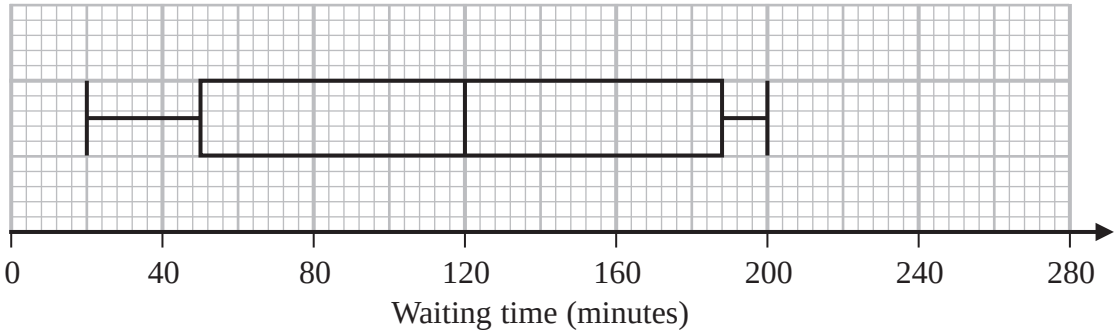
4 At the end of 2017
the value of Tamara's house was £220 000
the value of Rahim's house was £160 000

At the end of 2019
the value of Tamara's house had decreased by 20%
the value of Rahim's house had increased by 30%

At the end of 2019, whose house had the greater value?
You must show how you get your answer.

(Total for Question 4 is 4 marks)

9 The box plot shows information about the length of time, in minutes, some people waited to see a doctor at a hospital on Monday.



(a) Work out the interquartile range of the information in the box plot.

..... minutes

(2)

Becky says,

"50% of the people waited for at least 2 hours."

(b) Is Becky correct?
Explain why.

.....

.....

.....

(1)

The table gives information about the length of time, in minutes, some people waited to see a doctor at the same hospital on Tuesday.

	Waiting time (minutes)
Shortest time	20
Lower quartile	50
Median	100
Upper quartile	140
Longest time	210

Becky was asked to compare the distribution of the lengths of times people waited on Monday with the distribution of the lengths of times people waited on Tuesday.

She wrote,

"People had to wait longer on Tuesday than on Monday."

(c) Give **one** reason why Becky may be wrong.

.....

.....

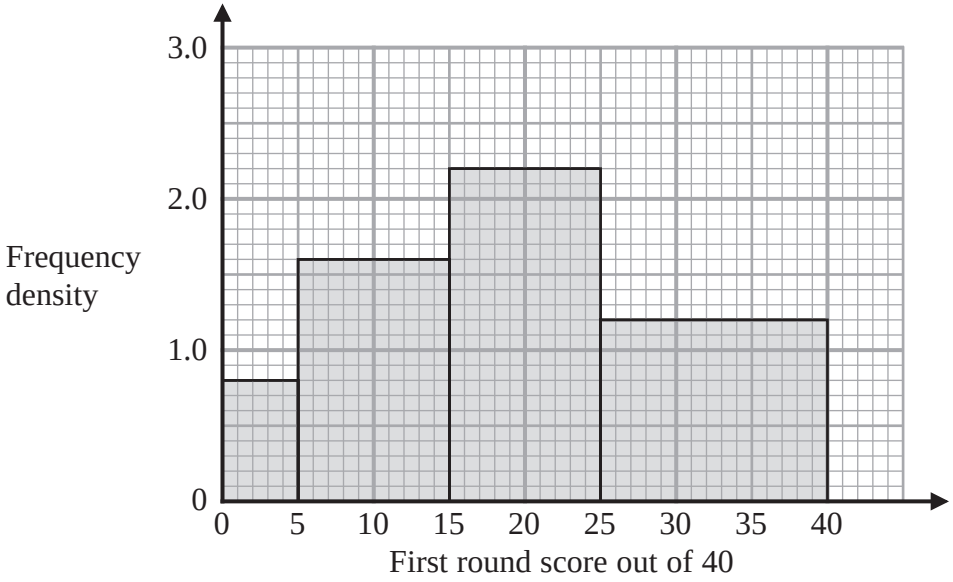
.....

(1)

(Total for Question 9 is 4 marks)

17 Some people took part in the first round of a competition.

The histogram gives information about the scores of these people in the first round.



20% of the people got a score high enough for them to qualify for the second round.

Work out an estimate for the score needed to qualify for the second round.
You must show all your working.

.....

(Total for Question 17 is 4 marks)

20 In a village,

if it rains on one day, the probability that it will rain on the next day is 0.8
if it does **not** rain on one day, the probability that it will rain on the next day is 0.6

A weather forecaster says,

"There is a 70% chance that it will rain in the village on Monday."

Work out an estimate for the probability that it will rain in the village on Wednesday.
You must show all your working.

.....

(Total for Question 20 is 4 marks)

3 A delivery company has a total of 160 cars and vans.

the number of cars : the number of vans = 3 : 7

Each car and each van uses electricity or diesel or petrol.

$\frac{1}{8}$ of the cars use electricity.
25% of the cars use diesel.
The rest of the cars use petrol.

Work out the number of cars that use petrol.
You must show all your working.

.....

(Total for Question 3 is 5 marks)

4 Jo is going to buy 15 rolls of wallpaper.

Here is some information about the cost of rolls of wallpaper from each of two shops.

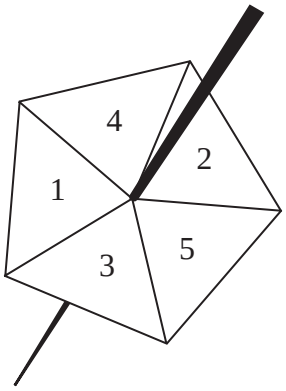
Chic Decor	**Style Papers**
3 rolls for £36	Pack of 5 rolls normal price £70 12% off the normal price

Jo wants to buy the 15 rolls of wallpaper as cheaply as possible.

Should Jo buy the wallpaper from Chic Decor or from Style Papers?
You must show how you get your answer.

(Total for Question 4 is 4 marks)

10 Lina spins a biased 5-sided spinner 40 times.



Here are her results.

Score	1	2	3	4	5
Frequency	6	8	9	7	10

Lina is now going to spin the spinner another two times.

(a) Work out an estimate for the probability that she gets a score of 5 both times.

.....

(2)

Derek is going to spin the spinner a large number of times.

(b) Work out an estimate for the percentage of times Derek can expect to get a score of 1

.....%

(2)

(Total for Question 10 is 4 marks)

Question 135

November 2022 | 1MA1/2H | Original Q8

8 Chanda buys a necklace for £120
She sells the necklace for £135

Work out her percentage profit.

.....%

(Total for Question 8 is 3 marks)

17 There are four boxes on a shelf, **A**, **B**, **C** and **D**.

The total weight of **A** and **B** is 3 times the total weight of **C** and **D**.

The weight of **A** is $\frac{2}{3}$ of the weight of **B**.

The weight of **C** is 75% of the weight of **D**.

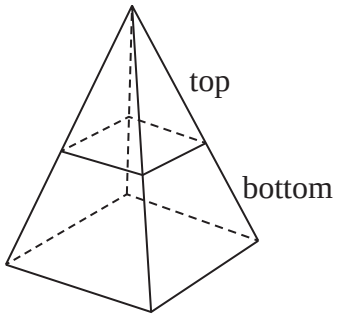
Find the ratio

weight of **A** : weight of **B** : weight of **C** : weight of **D**

.....

(Total for Question 17 is 4 marks)

25 The pyramid **P** is formed from two parts made of different materials.



The top part of **P** has a mass of 92.8 g and is made from material with a density of 2.9 g/cm^3
The bottom part of **P** has a mass of 972.8 g
The average density of **P** is 4.7 g/cm^3

Calculate the volume of the top part of **P** as a percentage of the total volume of **P**.
Give your answer correct to 1 decimal place.
You must show all your working.

.....%

(Total for Question 25 is 5 marks)

Question 138

June 2023 | 1MA1/1H | Original Q7

7 The price of a holiday increases by 20%
This 20% increase adds £240 to the price of the holiday.

Work out the price of the holiday before the increase.

£.....

(Total for Question 7 is 2 marks)

6 Last year a family recycled 800 kg of household waste.
57% of this waste was paper and glass.

weight of paper recycled : weight of glass recycled = 12 : 7

Calculate the weight of glass the family recycled.

..... kg

(Total for Question 6 is 3 marks)

2 Jonny wants to know how much coffee he will need for 800 people at a meeting.

Each person who drinks coffee will drink 2 cups of coffee.
10.6 g of coffee is needed for each cup of coffee.

Jonny assumes 68% of the people will drink coffee.

(a) Using this assumption, work out the amount of coffee Jonny needs.
Give your answer correct to the nearest gram.

..... g
(4)

Jonny's assumption is wrong.
72% of the people will drink coffee.

(b) How does this affect your answer to part (a)?

.....

.....

.....

(1)

(Total for Question 2 is 5 marks)

Question 141

9 Some people were asked if they wanted a new television.

70% of the people said yes.
80% of the people who said yes wanted a television with a large screen.

What percentage of the people asked said they wanted a television with a large screen?

.....%

(Total for Question 9 is 2 marks)

Question 142

8 The normal price of a mattress is reduced by 40% in a sale.
The price of the mattress in the sale is £660

Work out the normal price of the mattress.

£.....

(Total for Question 8 is 2 marks)

2 Karen is organising a party for a charity.

She spends
£100 on food
£120 on a hall
£80 on a DJ.

Karen sells 54 tickets for the party.
Each ticket costs £7.50

Work out the percentage profit Karen makes for the charity.

.....%

(Total for Question 2 is 4 marks)

7 Kasim has some small jars, some medium jars and some large jars.
He has a total of 400 jars.

$\frac{3}{8}$ of the 400 jars are empty.

For the empty jars,

number of small jars : number of medium jars = 3 : 4
number of medium jars : number of large jars = 1 : 2

Work out the percentage of Kasim's jars that are empty small jars.

.....%

(Total for Question 7 is 5 marks)

Question 145

9 In a sale, the normal price of a coat is reduced by R%

Given that

$$\text{sale price} = 0.7 \times \text{normal price}$$

find the value of R.

R = ...

(Total for Question 9 is 1 mark)

6 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.

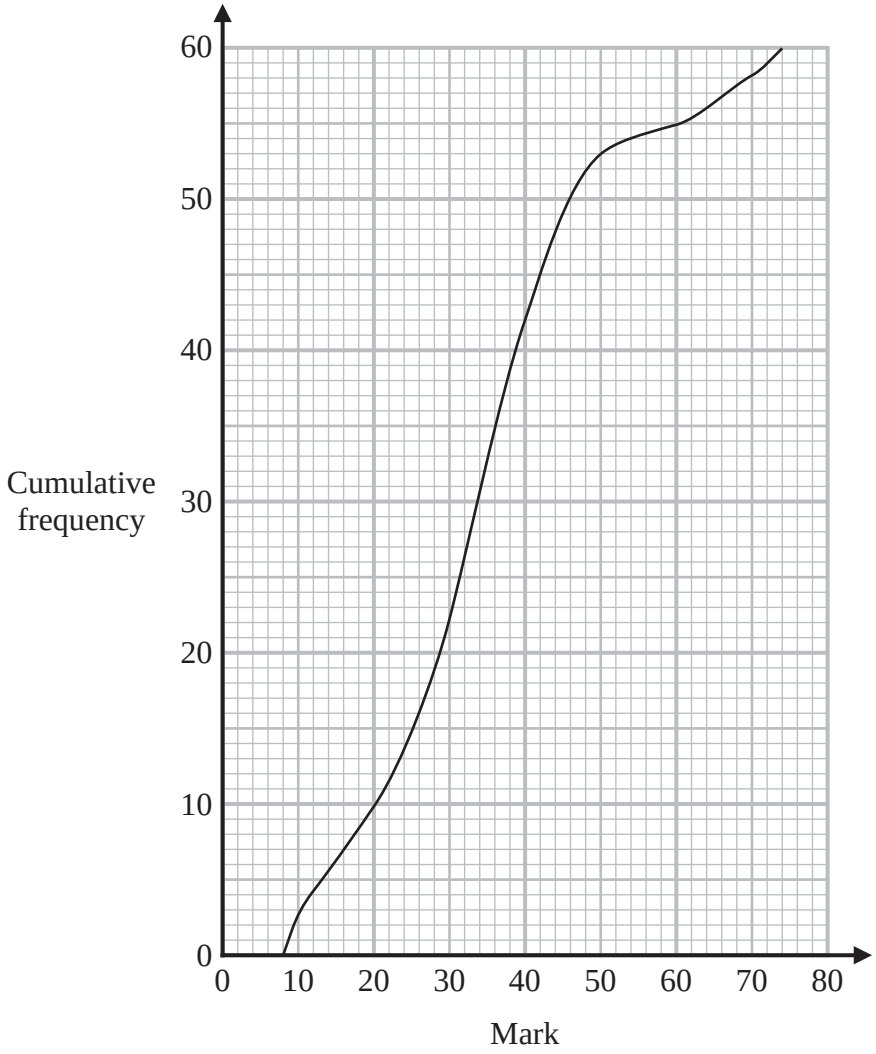
Tina says,

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

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

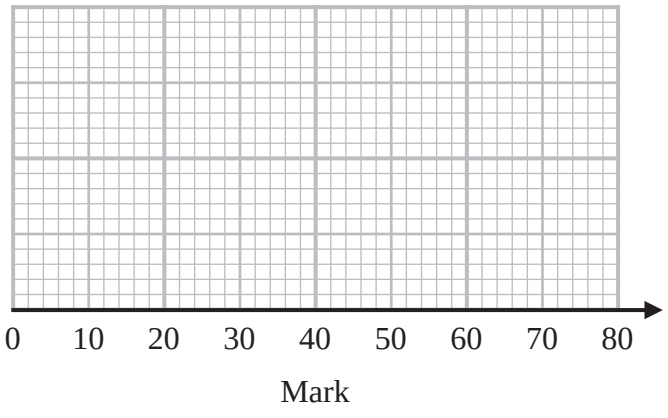
(Total for Question 6 is 4 marks)

9 The cumulative frequency graph gives information about the marks that 60 students got in a test.



For these 60 students
the highest mark was 74
the lowest mark was 8

(a) On the grid below, draw a box plot for the distribution of the marks.



(3)

The pass mark for the test was 40

Sian says,

"30% of the 60 students passed the test."

(b) Is Sian correct?
You must show how you get your answer.

(3)

(Total for Question 9 is 6 marks)

12 **A**, **B** and **C** are three solid spheres.

Sphere **A** has a volume of $64\,\text{cm}^3$
Sphere **B** has a volume of $125\,\text{cm}^3$

The radius of sphere **C** is 50% of the radius of sphere **B**.

Work out the ratio of the surface area of sphere **A** to the surface area of sphere **C**.
Give your answer in the form $a:b$ where a and b are integers.

.....

(Total for Question 12 is 4 marks)

Question 149

6 The cost of a first class stamp increased from 76p to 85p.
The cost of a second class stamp increased from 65p to 66p.

Filip says,

> "The percentage increase in the cost of a first class stamp is more than 7 times the percentage increase in the cost of a second class stamp."

Is Filip correct?
You must show all your working.

(Total for Question 6 is 4 marks)

5 Robyn buys a total of 240 pens and pencils, where

$$\text{number of pens} : \text{number of pencils} = 3 : 5$$

Robyn pays 9p for each pen.
She sells each pen for 11p.

Robyn pays 6p for each pencil.
She sells each pencil for 10p.

Robyn sells all of the pens and pencils.

Work out Robyn's percentage profit.
Give your answer correct to 1 decimal place.
You must show all your working.

.....%

(Total for Question 5 is 5 marks)

Question 151

November 2024 | 1MA1/3H | Original Q10

10 In a sale, the normal prices are reduced by 15%
Amina buys a dress in the sale for £46.75

Work out the normal price of the dress.

£.....

(Total for Question 10 is 2 marks)

Question 152

3 Mia pays £25 for 200 oranges.

Mia puts the oranges into bags.
She puts 5 oranges into each bag.

Mia sells all the bags of oranges for £1 each bag.

Work out Mia's percentage profit.

.....%

(Total for Question 3 is 3 marks)

12 The price of a holiday is increased by 10%

After the increase, the price of the holiday is £440

Jim says,

"10% of £440 is £44 so the price of the holiday before the increase was £396"

(a) Is Jim correct?
Explain your answer.

.....

.....

.....

(1)

Tina sells bikes.

In November, Tina sold 25% fewer bikes than she sold in October.
In December, Tina sold 50% more bikes than she sold in November.

In December, Tina sold 180 bikes.

(b) How many bikes did Tina sell in October?

.....

(3)

(Total for Question 12 is 4 marks)