GCSE to Core Maths

Transition Pack

AQA

Name: ....

Core Maths – Transition work Summer

Welcome to the Core maths course! The work below is to be completed over the summer to prepare you for the start of the course.

Please spend QUALITY time on this work, showing your METHOD to get the solutions. A large part of marking in Core maths is being able to justify an answer even if the solution you found is not perfect! Choose ONE of the following questions.

Question 1

Cost to the Moon
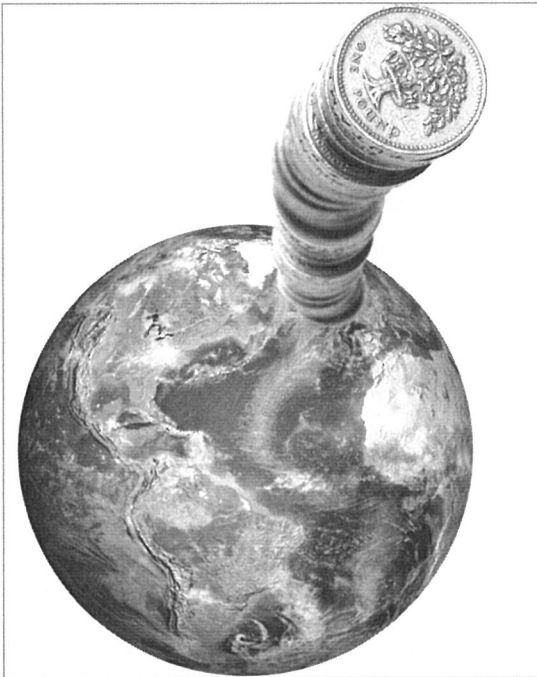
**What would be cheaper to do:** ✦ Build a rocket to get to the moon Or:

✦ Create a stack of pound coins to reach the moon?

The question here is left intentionally vague to get you thinking. Research as much as you can (google) and (stating your assumptions) create a presentation to discuss your findings (this should be around 1 page of A4 minimum so you will need to spend some time really thinking about this). **Your presentation should take around 5 minutes.**

Question 2

A piece of cake!
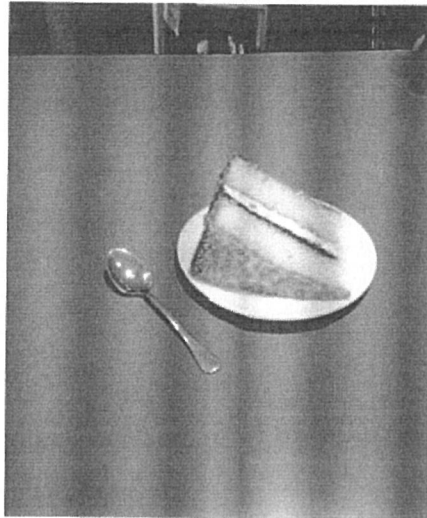
How much profit is the cake shop making on this cake? Feel free to use google to help you here. Again, make sure you are showing all your workings and assumptions. You will be expected to present this to the class at the start of the course (this should be 1 page of A4 minimum so you will really need to go into some detail). **Your presentation should take around 5 minutes.**

As part of the course there are some areas of mathematics that you will be expected to be already proficient.

These areas are:

- **Percentages and percentage change using a multiplier**
- **Cumulative frequency and Box plots (creating and comparing)**
- **Histograms**
- **Pythagoras**
- **Scatter graphs and drawing a line of best fit**

Below are some questions on these topics that you "should" already be able to answer. Feel free to use any resource available to you (revision guides, internet, etc) to help answer these questions to the best of your ability. Leaving a question blank because you do not know how to answer it is not acceptable as you have permission to look up how to answer questions!

Q1.

A train ticket costs £23.50
The price increases by 6%.
Felix has £100.

Can Felix buy four tickets at the new price?

_____

_____

_____

_____

_____

(Total 4 marks)

Q2.

In 2015, Han was paid £1350 per month.

In 2016, he

had a 2% increase in his monthly pay.

worked 37.5 hours per week.

worked for 47 weeks.

Work out Han's average pay **per hour** for 2016

_____

_____

_____

_____

_____

_____

Answer £ _____

(Total 5 marks)

Q3.

The cash price for a boiler is £2000
Customers can pay the cash price or pay monthly.

Cash Price	Pay Monthly
£2000	60 monthly payments of £40

Work out the percentage increase from the cash price when paying monthly.

_____

_____

_____

_____

_____

_____

_____

_____

Answer _____ %

(Total 4 marks)

Q4.

Julie works 20 hours each week.
She earns £7.50 per hour.
She saves one-fifth of her earnings.

She wants to buy an iPad costing £429.

How many weeks does it take her to save enough to buy this iPad?
You **must** show your working.

_____

_____

_____

_____

_____

_____

Answer _____

(Total 4 marks)

Q5.

Andrew is paid £250 a week.
Each week, he

  shares his pay with his sister in the ratio 3 : 2

  saves 12% of his share.

How many weeks will it take Andrew to save £360?

_____

_____

_____

_____

_____

_____

_____

_____

Answer _____

(Total 5 marks)

Q6.

Here is some information about the test marks of 120 students.

Mark, m	$0 < m \leq 10$	$10 < m \leq 20$	$20 < m \leq 30$	$30 < m \leq 40$	$40 < m \leq 50$
Frequency	20	28	40	20	12

(a)   Complete the cumulative frequency table.

Mark, m	$m \leq 10$	$m \leq 20$	$m \leq 30$	$m \leq 40$	$m \leq 50$
Cumulative frequency	20	48			

(1)

(b)   Draw a cumulative frequency graph.
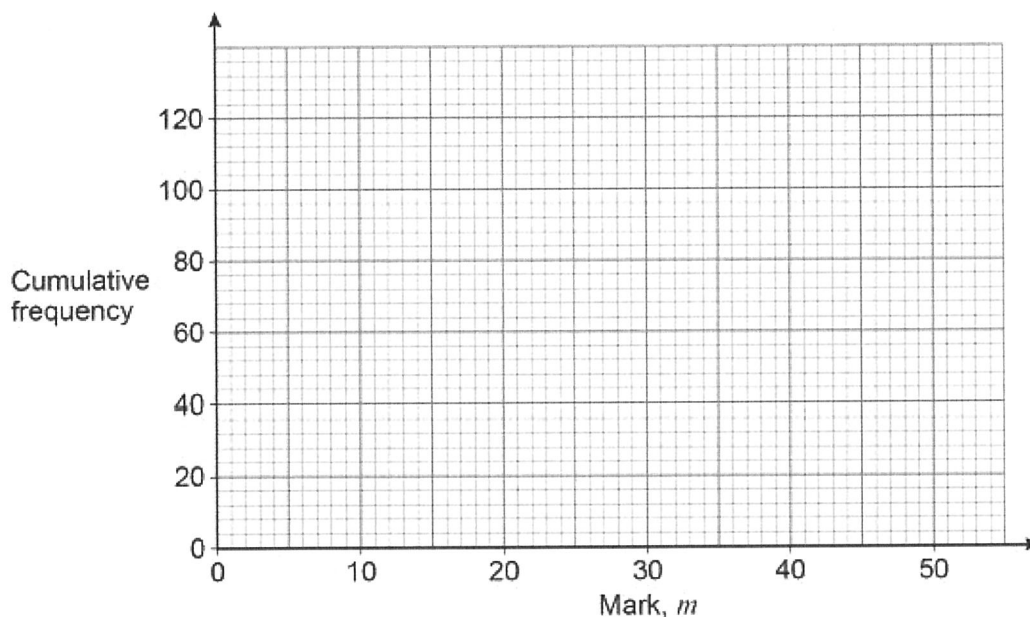
(2)

(c)   Students who scored 15 marks or fewer take another test.

Use your graph to estimate how many students take another test.

_____

_____
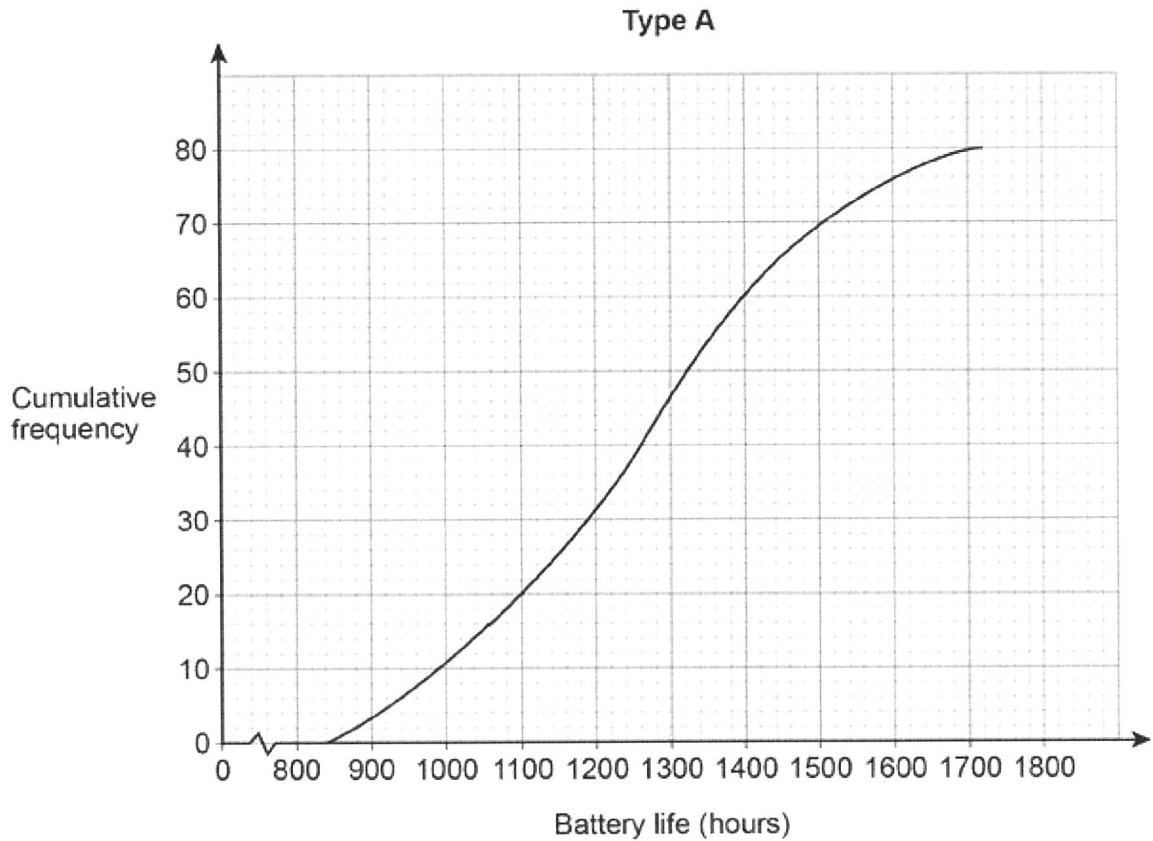
Answer _____

(2)

(Total 5 marks)

Q7.

Type A batteries and type B batteries were tested.

The cumulative frequency diagram shows information about the battery life of type A.

Type A

Battery life (hours)

(a) Estimate the interquartile range for type A.
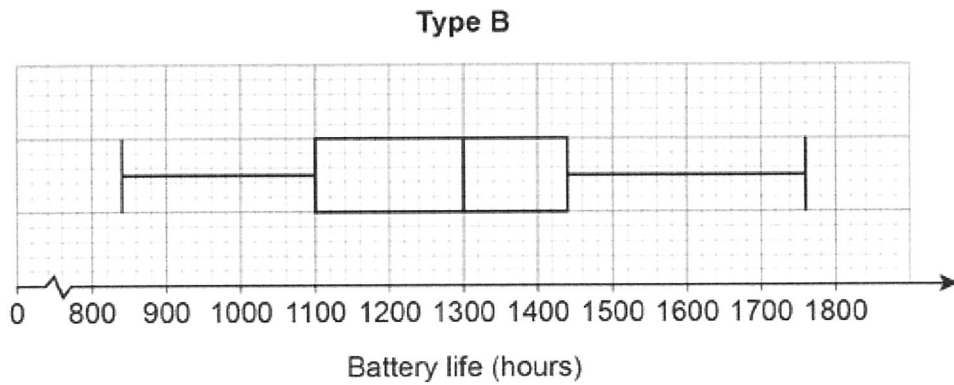
_____

_____

Answer _____ hours

(2)

(b) Estimate the number of type A batteries that had a battery life of more than 1600 hours.

_____

_____

Answer _____

(1)

(CONTINUED OVER THE PAGE)

(c)   The box plot shows information about the battery life of type B.

Type B

Battery life (hours)

On average, which type had the greater battery life?
Tick a box.

☐ type A   ☐ type B

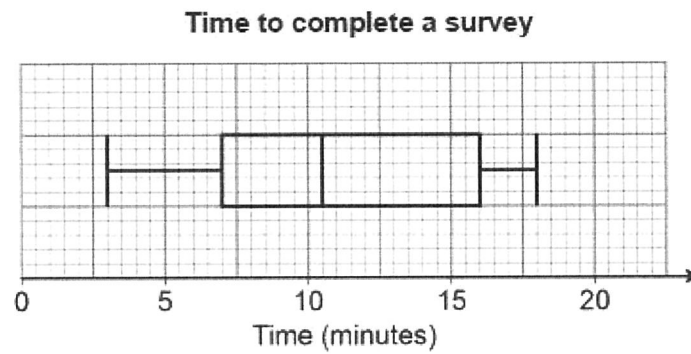Using data from **both** diagrams, state how you chose your answer.

_____

_____

_____

_____

_____

_____

(2)
(Total 5 marks)

Q8.

Here is some information about the times people took to complete a survey.

Fastest time	3 minutes
Slowest time	18 minutes
Median	11 minutes
Lower quartile	7 minutes
Interquartile range	8 minutes

Ben draws this box plot to show the information.

Time to complete a survey

Time (minutes)

Make **two** criticisms of his box plot.

Criticism 1 _____

_____

_____

Criticism 2 _____
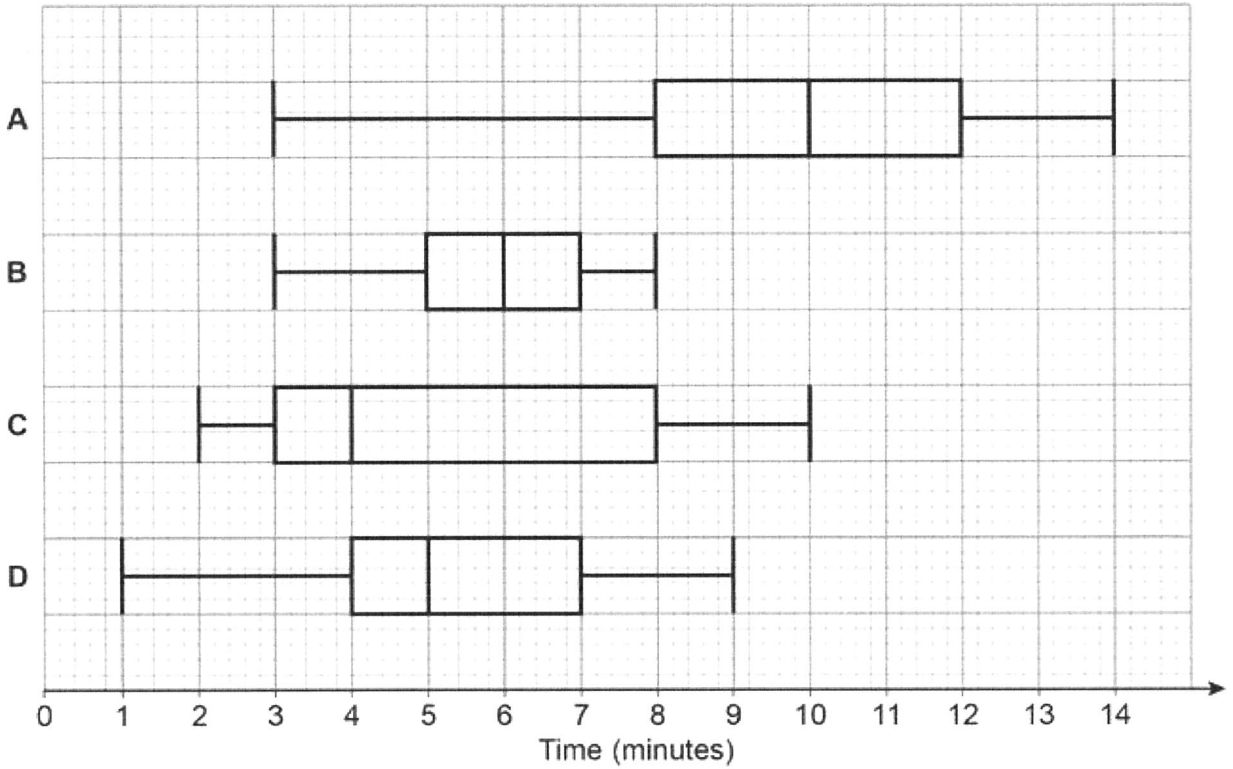
_____

_____

(Total 2 marks)

Q9.

In a survey, queuing times at supermarket checkouts were recorded.

One morning, samples of 50 customers were taken at supermarkets A, B, C and D.

The box plots represent the results.

Queuing times

Time (minutes)

(a)   On average, which supermarket had the lowest queuing times?

Give a reason for your answer.

Supermarket _____

Reason _____

_____

(2)

(b)   At which supermarket were the queuing times most consistent?

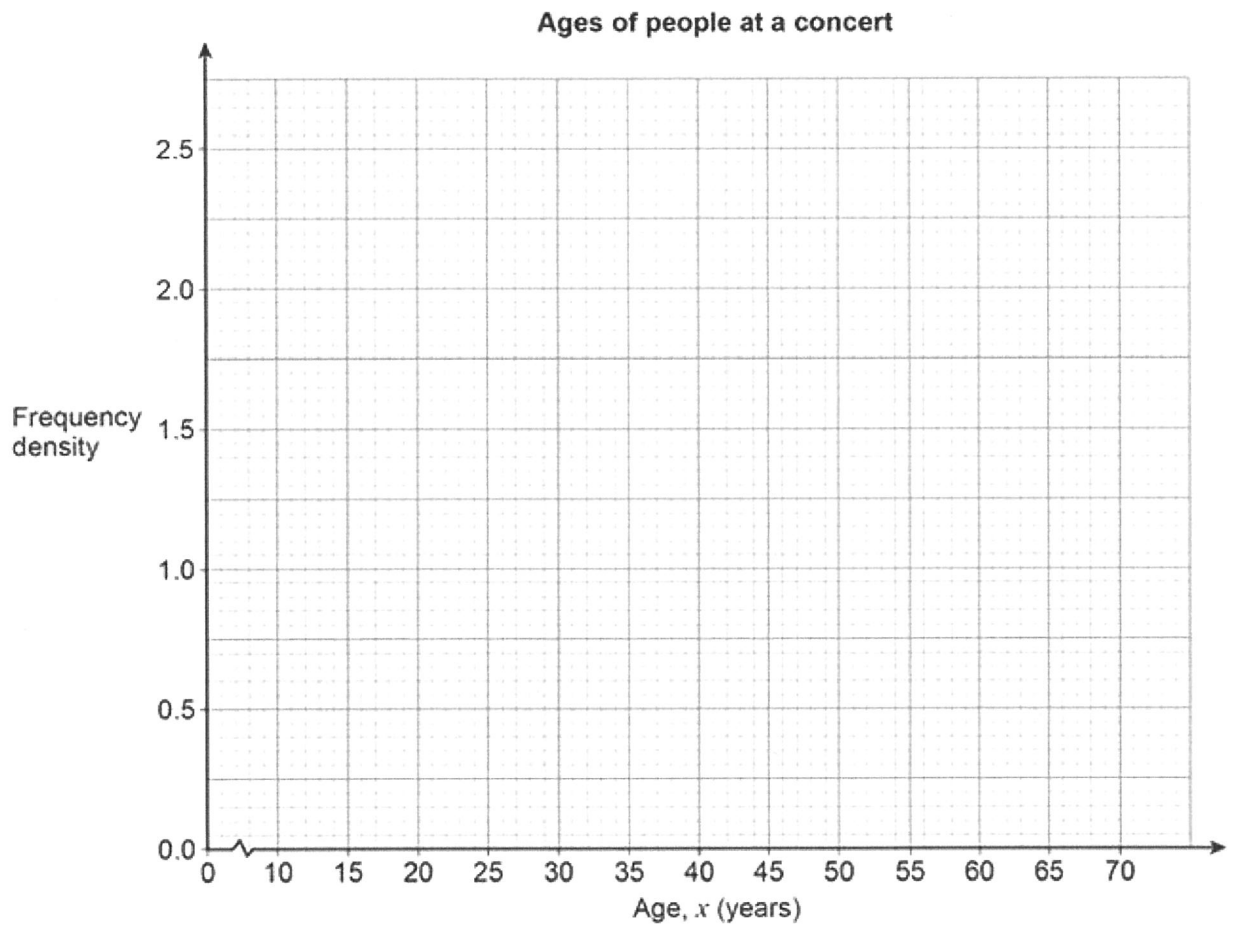Give a reason for your answer.

Supermarket _____

Reason _____

_____

(2)
(Total 4 marks)

Q10.

Here is some information about the ages of people at a concert.

Age, x (years)	Frequency
$10 \le x < 15$	8
$15 \le x < 25$	24
$25 \le x < 40$	30
$40 \le x < 70$	39

Draw a histogram to represent the information.

Ages of people at a concert

Age, x (years)

(Total 3 marks)

Q11.

Here is some information about a tennis club.

Members of a tennis club

Frequency density

Age, A years
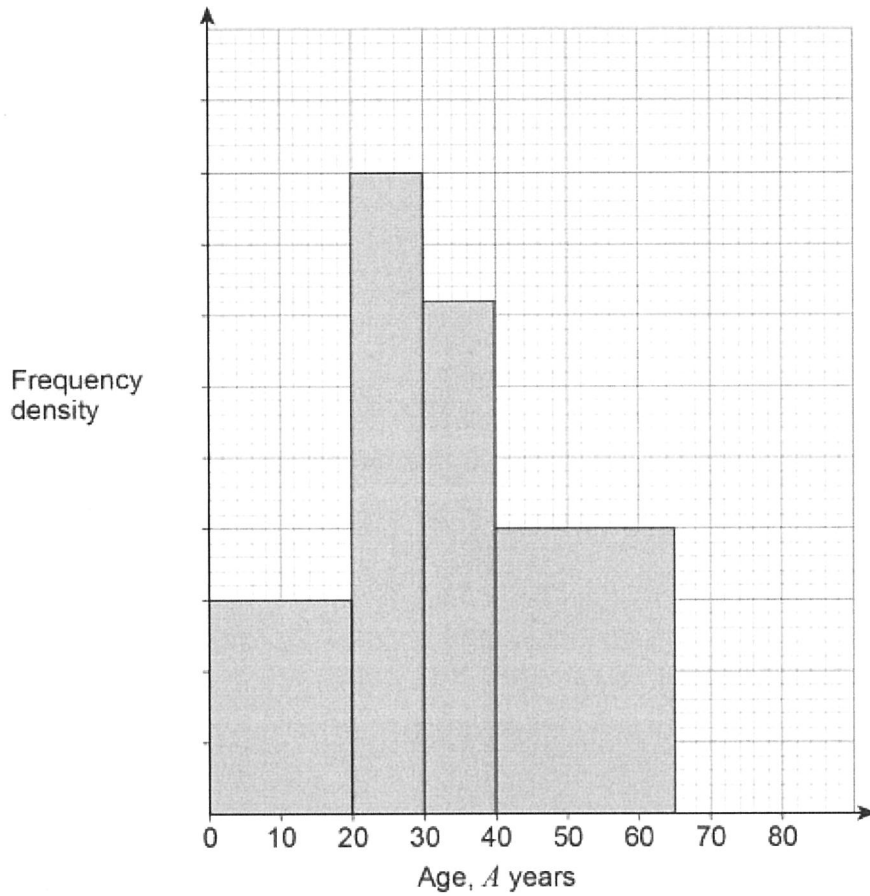
There are 30 members with $\quad A < 20$

There are 12 members with $\quad 65 \leq A < 20$

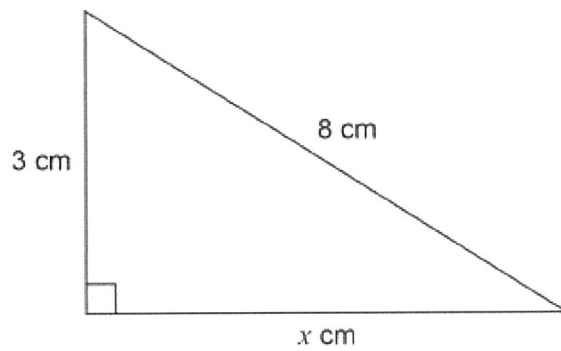There are no members with $\quad A \geq 80$

(a) Complete the histogram.

_____

_____

_____

_____

_____

(3)

(CONTINUES OVER THE PAGE)

(b) Work out the total number of members of the club.

_____

_____

_____

_____

_____

Answer _____

(2)

(Total 5 marks)

Q12.

Not drawn
accurately

8 cm

3 cm

x cm

Work out the value of x as a decimal.

_____

_____

_____

_____

_____

_____

_____

_____

Answer _____

(Total 3 marks)

Q13.

Here is a right-angled triangle.

Not drawn
accurately

7.2 cm

x cm

9.6 cm
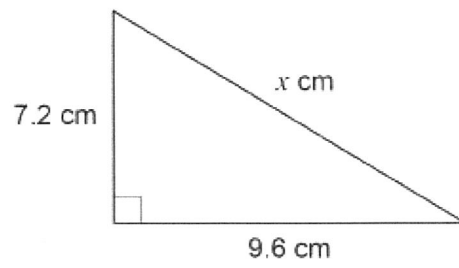
Show that $x = 12$
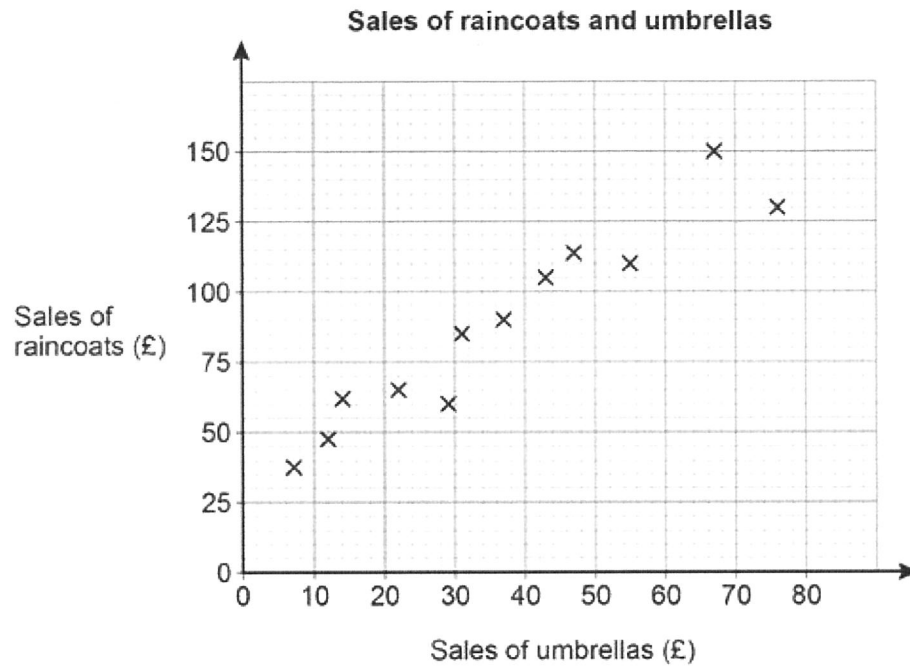
_____

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_____

_____

_____

_____

_____

_____

(Total 2 marks)

Q14.

A shop sells raincoats and umbrellas.

The scatter graph shows the monthly sales for 12 months.

Sales of raincoats and umbrellas

(a) Write down the type of correlation shown by the graph.

Answer _____ °

(1)

(b) The manager expects the sales of umbrellas next month to be £60

Draw a line of best fit to estimate the sales of raincoats next month.

Answer £ _____

(3)

(Total 4 marks)

Converting Fractions, Decimals, Percentages

Part 1: Percentages to Decimals

(a) 15.2% (b) 23.5% (c) 90.3% (d) 62.81%

(e) 1.7% (f) 6.8% (g) 8.15% (h) 0.5%

(i) 0.49% (j) 0.03%

Part 2: Decimals to Percentages

(a) 0.125 (b) 0.953 (c) 0.382 (d) 0.603

(e) 0.075 (f) 0.021 (g) 0.1425 (h) 0.9682

Part 3: Key Equivalents

For each of the following fractions, write the equivalent decimal and percentage.

(a) $\dfrac{1}{2}$ (b) $\dfrac{1}{4}$ (c) $\dfrac{3}{4}$ (d) $\dfrac{1}{5}$ (e) $\dfrac{1}{3}$ (f) $\dfrac{1}{10}$ (g) $\dfrac{2}{3}$

Calculating Percentages

Part 1 : Calculating Basic Percentages

(a) 15% of 80ml   (b) 9% of 205kg   (c) 45% of £135   (d) 17% of 540km

(e) 53% of 700g   (f) 14% of 12 hours   (g) 31% of 280kg   (h) 6% of 4GB

(i) 85% of 1250ml   (j) 66% of 9.4 miles

Part 2: Increasing and decreasing

(a) Increase 20 by 50%   (b) Increase 60p by 10%   (c) Increase 12g by 25%

(d) Decrease 55cm by 40%   (e) Decrease 64 by 75%   (f) Decrease £3 by 10%

(g) Increase 204 by 98%   (h) Decrease 149mm by 91%   (i) Increase 88 by 185%

(j) Gabriel's salary is £24500.
Next year he is due to get a 9% increase.
What will his new salary be?

Ratios

Part 1 : Ratio given one value

Question 1:   A drawer contains white socks and black socks only.
The number of white socks to the number of black socks is in the ratio 1:3
There are 12 white socks.

(a) Work out the number of black socks in the drawer.
(b) Work out the total number of socks in the drawer.

Question 2:   James has some apples and oranges.
The ratio of apples and oranges is 2:5
He has 15 oranges.
How many apples does James have?

Question 3:   The ratio of lemon sweets to strawberry sweets in a tub is 5:3
There are 120 lemon sweets in the tub.
How many strawberry sweets are in the tub?

Question 4:   Rachel has some first class and some second class stamps.
The ratio of the number of first class to the number of second class stamps is 3:4
Rachel has 18 first class stamps.

(a) How many second class stamps does Rachel have?
(b) How many stamps does Rachel have in total?

Part 2: Sharing a ratio 1:n

Question 5:   Express each of the following ratios in the form $1 : n$

(a) $2 : 3$ (b) $5 : 4$ (c) $4 : 10$ (d) $10 : 7$

(e) $8 : 13$ (f) $5 : 81$ (g) $100 : 131$ (h) $200 : 77$

Question 6:   Express each of the following ratios in the form $n : 1$

(a) $7 : 2$ (b) $9 : 5$ (c) $11 : 3$ (d) $5 : 8$

Converting Units

(a) 2 m into mm   (b) 8 m into mm   (c) 6500 mm into m

(d) 9000 mm into m   (e) 48000 cm into km   (f) 9250000 cm into km

(g) 780 mm into m   (h) 4km into cm   (i) 1km into mm

Convert the following into kilograms

(a) 7000 g   (b) 3000 g   (c) 12000 g   (d) 40000 g

(e) 1.6 tonnes   (f) 9.25 tonnes   (g) 0.3 tonnes   (h) 0.06 tonnes

Question 3: James and Jack buy a 3 litre carton of orange juice.
Each boy drinks 650 ml of orange juice.
How much orange juice is left?
Give your answer in litres.

Question 4: Rebecca has two dogs, Lucky and Pepe.
Lucky weighs 5.4 kilograms.
Pepe is 800 grams lighter than Lucky.
Work out how much Pepe weighs.
State your units.

Question 5: A 2p coin has a mass of 7 grams.
Find the total mass of £80 worth of 2p coins.
Give your answer in kilograms.

Rounding

Part 1: To the nearest 10, 100, 1000…

Question 1: 645 people attended a concert. Round this to the nearest 10.

Question 2: 861 students attend a school. Round this to the nearest 100.

Question 3: The cost of a laptop is £1348. Round this to the nearest £100.

Question 4: 24,812 people attended a football match. Round this to the nearest thousand.

Question 5: The population of a city is 85,398. Round this to the nearest thousand.

Question 6: The number of beads in a jar is 50 to the nearest ten.
          (a) What is the minimum possible number of beads in the jar?
          (b) What is the maximum possible number of beads in the jar?

Question 7: The number of students at a school is 1200 to the nearest 100.
          What is the maximum possible number of students at the school?

Part 2: To significant figures

Question 1: In an election 43.8% of people voted for a candidate.
          Round this figure to one significant figure

Question 2: 32641 people watch a rugby match between Italy and Argentina.
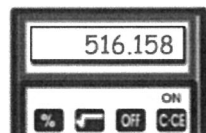   Round this number to 2 significant figures.

Question 3: Round the following numbers to 1 significant figure

(a) eight million, six hundred thousand   (b) the product of 19 and 351

Question 4: Tom has been asked to round the number on the calculator to 2 significant
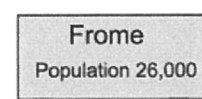   figures.
          Tom says the answer is 516.16

          Can you explain Tom's mistake?

516.158

ON
% 🖮 OFF CCE

Question 5: The population of Frome to 2 significant figures is 26,000.

(a) Write down the lowest number of people that could live in Frome?

Frome
Population 26,000

(b) Write down the greatest number of people that could live in Frome?

Standard Form

Question 1: Write each of the following numbers in standard form.

(a) 40000   (b) 2000000   (c) 8000000   (d) 7000

Question 2: Write each of the following as ordinary numbers

(a) 3×10^4 (b) 9×10^3 (c) 6×10^6 (d) 2×10^{10}

Question 3: Write each of the following numbers in standard form.

(a) 0.002   (b) 0.0005   (c) 0.9   (d) 0.00000004

Question 4: Write each of the following as ordinary numbers

(a) 2×10^{-3} (b) 7×10^{-2} (c) 3×10^{-6} (d) 9×10^{-8}

Question 1: The distance between London and New York is 5,567,000 metres. Write this number in standard form.

Question 2: The distance from the Sun to Pluto is 3.67 billion miles. Write this number in standard form.
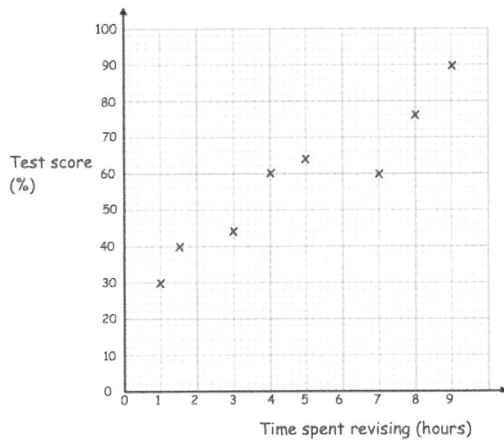
Question 3: The length of a cell is 0.016 mm Write this number in standard form.

Question 4: The population of a country is 6.51×10^5 Write the population of the country as an ordinary number.

Plotting and Interpreting Graphs

The scatter graph below shows information about the number of hours spent revising for a test and the test result for a group of 8 students.


(a) Daisy spent 7 hours revising for the test. What is Daisy's test score?

(b) Harry's test score was 30%. How many hours did Harry spend revising?

(c) Draw a line of best fit.

The scatter graph shows information about the cost of renting apartments and their distance from London.
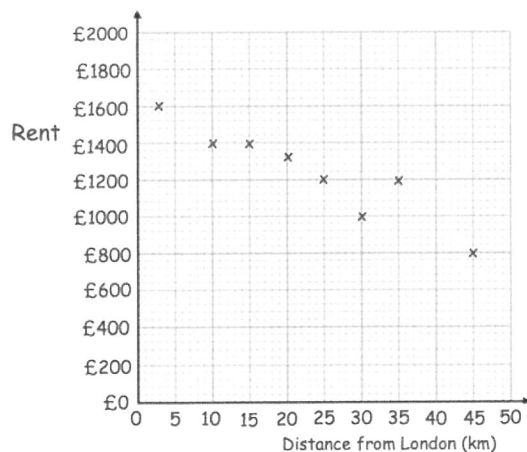
(a) Describe the relationship shown in the scatter graph.

(b) Draw a line of best fit on the diagram.

(c) Estimate the cost of renting an apartment 40km from London.

(d) Victor has £1100 to spend on rent. Estimate how close he could live to London.

Mr Hughes is a plumber.
The scatter graph shows the cost and the length of his last 10 jobs.
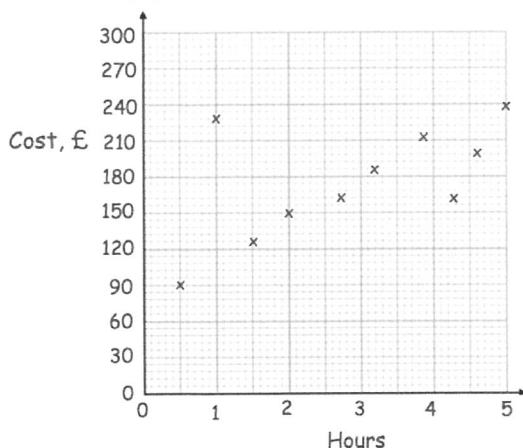
(a) Draw a line of best fit

(b) For one job Mr Hughes needed to replace an expensive part that he fitted quickly. How long did that job last?

(c) Estimate the cost of a job lasting 3.5 hours.

Y11-12 Compulsory Transition Task

Averages and the Range

Question 1: The length of nine caterpillars are listed below

> 9cm 4cm 8cm 10cm 7cm 5cm 13cm 10cm 6cm

(a) Find the mode
(b) Find the median
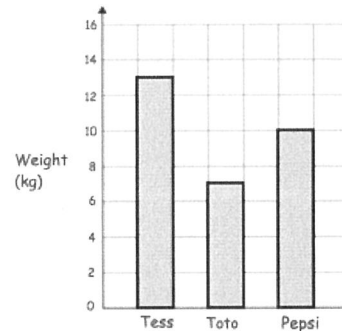(c) Find the mean
(d) Find the range

Question 2: James plays six games of darts.
His scores are 120, 71, 80, 14, 90, 117

Should James use the mean or the median to give him the highest average score?

Question 3: Shown are the weights of 3 puppies.

(a) Work out range of the weights

(b) Work out the median weight

(c) Work out the mean weight

Question 4: The amount of water in some containers are:

> 2 litres, 330ml, 0.08 litres, 0.7 litres, 75ml, 5000ml, 0.15 litres

(a) Work out the median   (b) Find the range