Level 2 Functional Skills Mathematics
SAMPLE PAPER 2

Duration: 1 hour 20 minutes
Total marks: 45 marks

City &
Guilds
A City & Guilds Group Business
Version 1.1

SECTION 2 – CALCULATOR PERMITTED

You should have the following for this assessment
• a calculator
• a pen with black or blue ink
• a pencil (for diagrams, graphs and charts only)
• an eraser
• a 30cm ruler.

You must NOT use a protractor.

General instructions
• Read through each question carefully.
• Show your working out (where required).
• Write all your working out and answers in this booklet.
• Check your calculations and check that your answers make sense.
• There are additional pages **including graph paper** at the back of this booklet if you
  run out of space or ask the invigilator if you need additional sheets of paper.

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Hints

Please note that these worked solutions have neither been provided nor approved by City & Guilds and may not necessarily constitute the only possible solutions. Please refer to the original mark schemes for full guidance.

Any writing in blue indicates what must be written in order to answer the questions and get the marks. The worked solutions have been designed to show the smallest amount of work which needs to be done to answer the question.

Anything written in green in a cloud doesn't have to be written in the exam.

Anything written in orange in a rectangle doesn't have to be written in the exam and is there to show what should be put into a calculator or measured using a ruler or protractor.

If you find any mistakes or have any requests or suggestions, please send an email to curtis@cgmaths.co.uk

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SECTION 2 – CALCULATOR PERMITTED

There are **45** marks in this section.

You should check all your work as you go along.

You may use a calculator.

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Q1

0.06 million ÷ 6.2 thousand =

Give your answer to two decimal places

(0.06 x 1000000)/(6.2 x 1000) = …

_____

(1 mark)

Q2

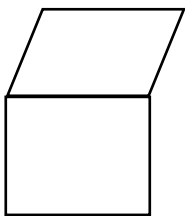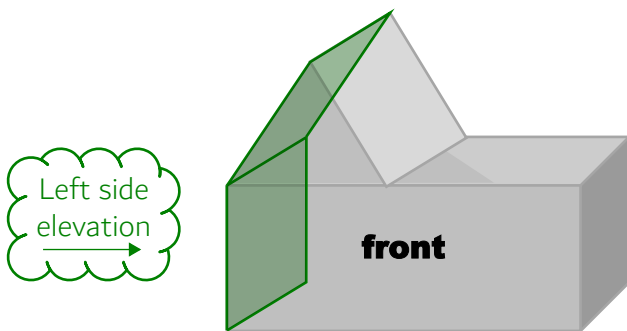What is $\frac{3}{87}$ as a decimal correct to **three decimal places**?

Decimal places are the figures after the decimal point

3/87 = …

_____

(1 mark)
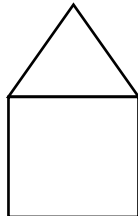
Q3 The diagram shows the outline of a building.

Left side elevation

front
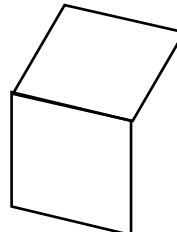
A   B   C   D

Which one of the above shows the elevation of the left side of the building?

(*tick one box*)

A ☐

B ☐

C ☐

D ☐

(1 mark)

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Q4

1m^3 is the same as

(*tick one box*)

A   100 cm^3 ☐

B   1000 cm^3 ☐

C   100 000 cm^3 ☐

D   1 000 000 cm^3 ☐

(1 mark)

Q5 A social club sells 50 pink raffle tickets and 75 yellow raffle tickets.

Tickets are drawn randomly.

What is the probability that the first ticket drawn will be a pink ticket?

Give your answer as a decimal.

_____

(1 mark)

1m^3 is the same as

Q6 The chart shows finishing times of marathon runners.
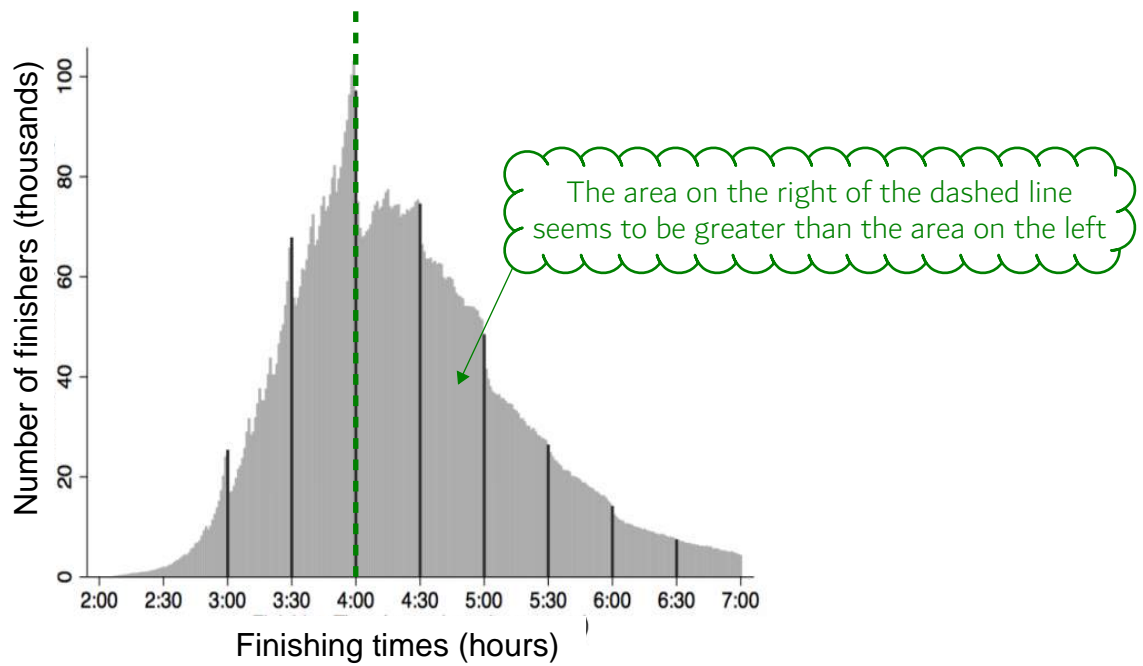
A report states that most of the runners finished in under 4 hours.

Is the report correct?

Explain your decision.

Decision *(tick one box)*   **Yes** ☐   **No** ☐

Explanation

(1 mark)

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Q7 A shop has a sale.
There is 30% off all black tag items.

30% OFF

Reduced price

£21

One day this notice appears in the shop.

> **One day only**
>
> **BLACK TAG**
>
> **An extra 25% off marked reduced price**
>
> **BETTER THAN HALF PRICE!**

A customer complains that the notice is misleading because it is not true.

> Is the customer correct?
>
> Explain your decision. Include calculations to support your decision.

Decision *(tick one box)* **Yes** ☐ **No** ☐

Show all your working

> 100 - 30 gives the percentage it decreases to after the 30% reduction. Putting this over 100 converts it into a fraction multiplier. Doing the same for the 25% reduction. Then multiplying the two fraction multipliers works out the proportion of the original price it has reduced to
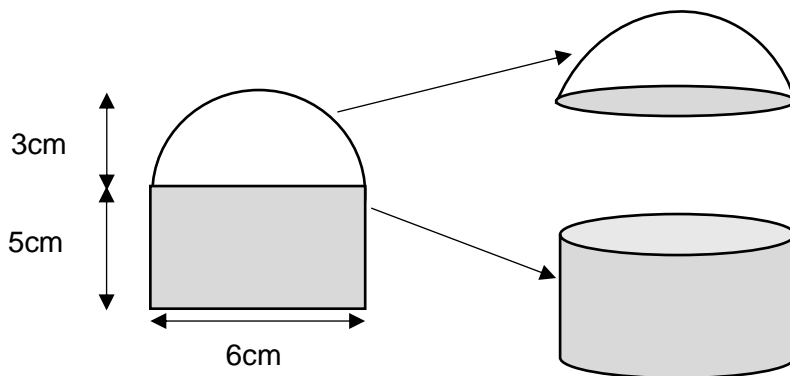
Explanation and supporting calculations.

(3 marks)

Q8 A craftsman uses resin to make a paperweight.

He makes the paper weight from two parts, a hemisphere **and** a cylinder.

He uses this plan.

$$V = \frac{2}{3}\pi r^3$$

V = volume of **hemisphere** in cm³

r = radius of **hemisphere** in cm

π = 3.14

3cm

5cm

6cm

How much resin does he need for **both** parts?

Show all your working

Adding the volume of the hemisphere and the cylinder gives the total amount of resin needed for both parts. Substitute 3.14 for π (this must be done instead of using the exact value of π as a value is given for π in the question) and substituted the value of the radius in the formula for the volume of the hemisphere to work out the volume of the hemisphere. A cylinder is like a prism so volume = cross sectional area x length. The length is 5cm. The cross section is a circle and area of circle = π x radius²

Amount of resin _____ **cm³**

(4 marks)

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Q9 A gardener wants to build this greenhouse in the top right hand corner of her garden.
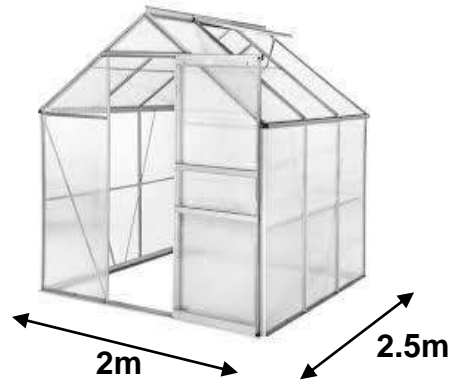
This is a sketch plan of her garden.

5.5m   greenhouse here

4m

5.5m

Work out these two lengths

2.5 m

50cm is 0.5m

2m   2.5m
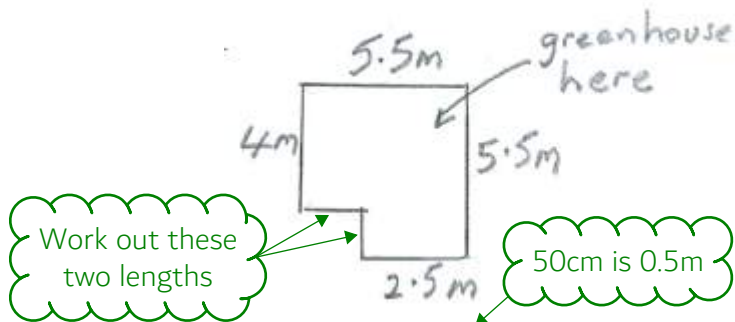
She will leave a 50cm space between the greenhouse and the edge of the garden.

She wants a scaled plan of the garden showing the position of the greenhouse.

Draw a scale plan. Put the scale you use on the plan.

Dividing the longest length of 5.5m by the length of the grid works out how many metres each centimetre can represent. Round it up to a suitable amount to make it easier to draw. Dividing each of the lengths by the amount each centimetre represents works out how many centimetres represent it. Write the scale in the form 1 : n, where n is the number of centimetres each centimetre on the grid represents

(4 marks)

There is spare graph paper on page 23

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Q10 A student wants to raise £100 for charity.

He will sell hot dogs at a disco.

He will make 150 hot dogs.

He buys ingredients at *The Supermarket*

The Supermarket

Hot dog sausages tin of 8   50p

Hot dog buns packet of 6   90p

If he sells all the hot dogs, what is the minimum price he must charge to make a profit of £100?

Show all your working

Work out how many tins of hot dog sausages and packets of hot dog buns are needed. There needs to be a whole number of each. Profit = income - outgoings, so income = profit + outgoings. The profit is £100 and the outgoings are the cost of the hot dog sausages and hot dog buns. Multiplying the number of each packet or tin needed by the cost of each in pounds works out the cost of these. Dividing the income needed by the 150 hot dogs sold works out the minimum price needed for each hot dog

Minimum price per hot dog _____

(4 marks)

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Q11 A supermarket buyer compares large eggs from two suppliers.

She wants to buy the largest eggs.

The table shows the masses of a sample of large eggs from Supplier A.

Weights of large eggs (Supplier A)	
Weight in grams	**Number of eggs**
63 < g ≤ 65	22
65 < g ≤ 67	27
67 < g ≤ 69	26
69 < g ≤ 71	15
71 < g ≤ 73	10

A similar sample taken from supplier B gives a mean value of 66.5g

Which supplier should the buyer use?
Explain your decision.

Decision *(tick one box)*   **Supplier A** ☐   **Supplier B** ☐

Show all your working

Explanation and supporting calculations.

Estimate the mean for supplier A. Adding the highest and lowest value for each category then dividing by 2 works out the midpoint of each category. Multiplying the midpoints by the number of eggs for each category works out an estimate of the total mass of each category. Adding all of these totals gives an estimated total mass of all of the eggs. Dividing this by the number of eggs gives an estimate of the mean mass for supplier A. The supplier with eggs of the highest estimated mean mass should be the supplier she should use

(4 marks)

Q12 A man has £5000.

He will put his money into a savings account at a bank.

He wants to save it for one year.

Bank A pays 2% compound interest. It adds interest every 6 months.

Bank B pays 3.15% annual interest rate.

Which bank should the man choose?
Explain your decision. Include calculations to support your decision.

Decision *(tick one box)*   **Bank A** ☐   **Bank B** ☐

Show all your working

Explanation and supporting calculations.

> Compound interest (meaning the percentage increase is always of the previous value) will be more than simple interest (meaning that the percentage increase is always of the original value). Working out the annual interest rate of Bank A using simple interest is enough information to work out which bank pays the most interest over the year
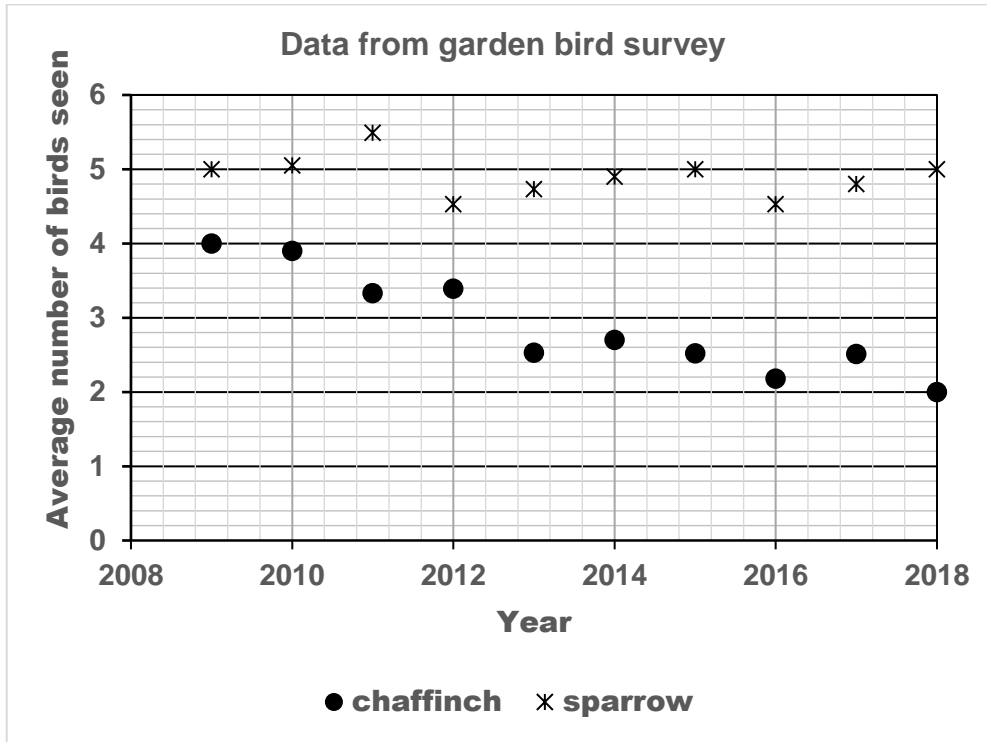
(4 marks)

Q13 A magazine article has this headline.

Garden birds in decline

Fewer birds seen in our gardens

An environmental organisation records information about bird populations.

The graph shows some data about two types of garden birds.

Is the magazine headline correct?

Show suitable calculations of percentage changes for the last ten years and draw trend lines on the graph to support your answer.

Explain your answer and make **two** comments.

Show all your working	
Comment 1	Percentage change = (new - original)/original x 100. Draw trend lines which go roughly in the same direction as the points and have an even spread of points on either side of the lines. The values for the percentage changes should be taken from points on the trend lines which cover 10 years. The comments should indicate whether the
Comment 2	magazine headline is correct and explain why. One comment can be about the chaffinches and the other can be about the sparrows

(5 marks)

Q14   A team manager wants to pick four people for a bowling competition.

She decides to pick players with consistently good average **(median)** scoring performances.

She picks the following three people.

Player	Average score (median) over last eight matches	Range of scores over last eight matches
Archie	105	26
Baz	101	37
Cathy	99	32

She needs one more player to make up the team.
She look at the scores of two more players.

Scores in last eight matches	
Dave	**Elaine**
78	87
48	98
102	101
98	84
86	93
101	79
67	87
96	97

Make suitable calculations for Dave and Elaine.
Decide which player best fits the requirements. Explain your decision using figures.

Player picked *(tick one box)* **Dave** ☐   **Elaine** ☐

Explanation and supporting calculations

Working out the medians by listing the scores in order then crossing out from both ends until there are two left in the middle. Working out the mean of the two in the middle works out the median. Range = largest - smallest. The lower the range, the more consistent. The medians should be similar but one of the players is much more consistent. So the player who is most consistent best fits the requirements

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Q15 A fisherman sets off from Dunsey in a boat.

His boat will travel at an average speed of 5 kilometres per hour.

He has this map so that he can avoid the rocks.
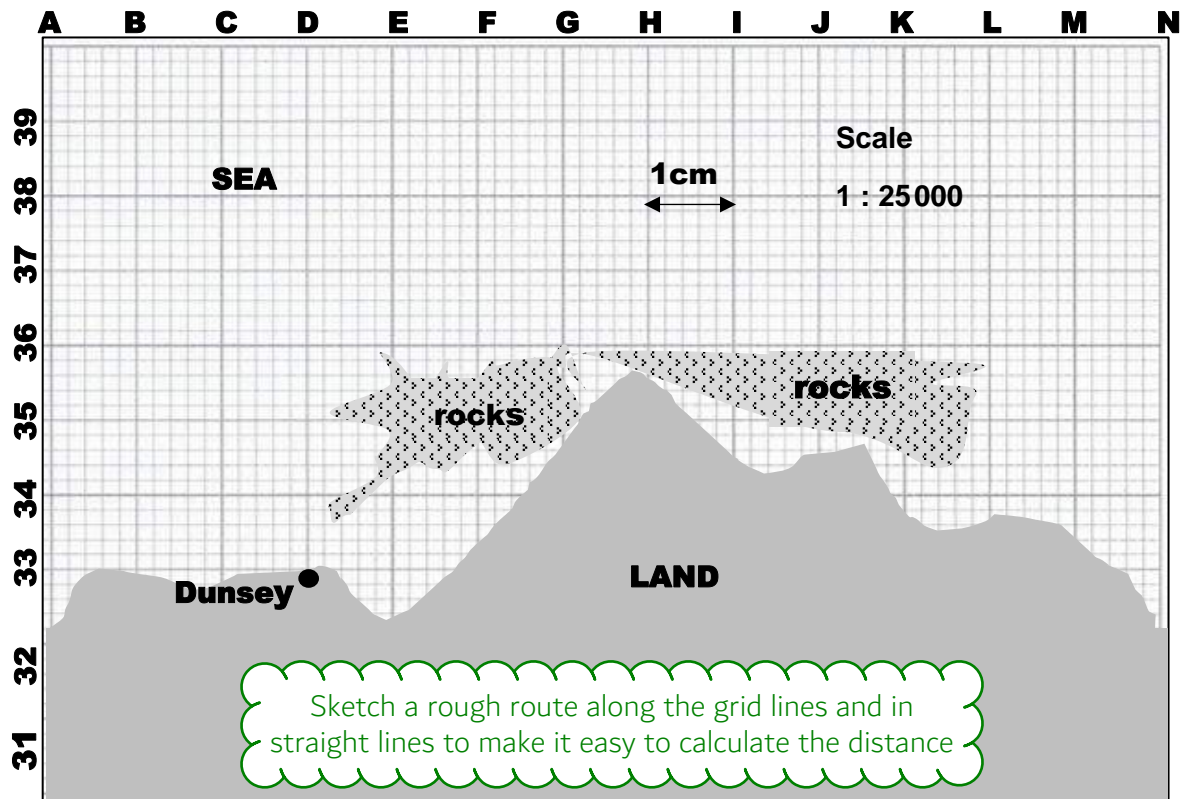
He needs to meet up with a ship at coordinate L34 at 5pm

He needs to know at what time he must leave Dunsey.

At what time must he leave Dunsey?

Show all your working.

s^d_t ← Writing the formula triangle for distance, speed, time

Subtracting the time taken in hours from 5pm works out the time he must leave Dunsey (the calculator can convert time in hours to conventional time). Multiplying the distance on the map by 25000 works out the actual distance in centimetres. This needs to be converted into kilometres as the speed is in kilometres per hour. There are 100 centimetres in a metre and 1000 metres in a kilometre

Time to leave Dunsey _____

(6 marks)