

SAMPLE PAPER 1
Level 2 Functional Skills Mathematics

Duration: 1 hour 20 minutes
Total marks: 45

SECTION 2 - CALCULATOR PERMITTED
VERSION 1.0

Candidate name (first, last)

First

Last

Candidate enrolment number

Date of birth (DDMMYYYY)

Assessment date (DDMMYYYY)

Centre number

Candidate signature and declaration*

- If you have used any additional answer sheets write the number of additional sheets in this box.
 - Please ensure that you **staple** additional answer sheets to the **back** of this booklet, clearly labelling them with your full name, enrolment number, centre number and date in **BLOCK CAPITALS**.
 - You must use a black or blue pen. You may use a pencil for charts and diagrams.
- *I declare that I had no prior knowledge of the questions in this assessment and that I will not share information about the questions.**

You should have the following for this assessment

- a pen with black or blue ink.
- a pencil (for diagrams, graphs and charts only)
- an eraser
- a 30cm ruler.



You may use a calculator for Section 2.

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.

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Worked Solutions



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.

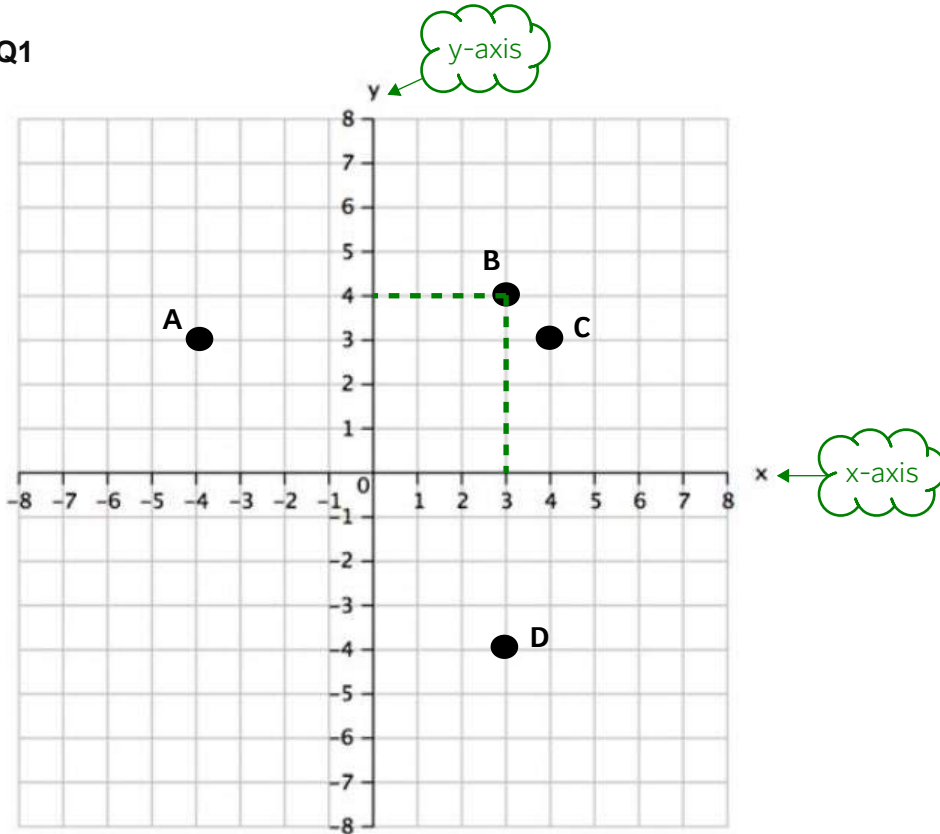
You should check all your work as you go along.

You may use a calculator.



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Q1



Which point is at (3,4)?

(tick one box)

- A. Point A
- B. Point B
- C. Point C
- D. Point D

The x-coordinate is 3 so the point needs to be level with 3 on the x-axis.
The y-coordinate is 4 so the point needs to be level with 4 on the y-axis

(1 mark)

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Q2

1 gallon = 4.546 litres

10 litres in gallons is approximately

(tick one box)

$$10/4.546 = 2.19\dots$$

- A. 0.45 gallons
- B. 2.2 gallons
- C. 45.5 gallons
- D. 22 gallons

Every 4.546 litres is 1 gallon so dividing the 10 litres by 4.546 works out how many lots it is and therefore how many gallons it is

(1 mark)

Q3

155	125	145	90	125	150	155
90	100	125	178	95	125	180

What is the mode of these numbers?

125 appears four times. This is more times than any other number so 125 is the mode

125

(1 mark)

Q4

Which one of the following lists is in increasing order?

(tick one box)

- A. 0.1013 0.0827 0.0095
- B. 0.1013 0.0095 0.0827
- C. 0.0095 0.1013 0.0827
- D. 0.0095 0.0827 0.1013

Comparing the tenths then the hundredths is enough to put them in order

(1 mark)

.CG Maths.

Q5

The surface area of a sphere is $4\pi r^2$

A sphere has a radius (r) that measures 3cm

Use $\pi = 3.142$

or $\pi = \frac{22}{7}$

Work out the surface area of the sphere to the nearest cm^2 .

A. 15cm^2

B. 22cm^2

C. 113cm^2

D. 1421cm^2

$$4 \times 3.142 \times 3^2 = 113.1...$$

Substituting 3.142 for π and 3 for r works out that the surface area is $113.1...\text{cm}^2$

(1 mark)

Q6 A man is going to New York for work. He wants to book a hotel online.

A friend says

'Remember the booking website will show the price in dollars. It will actually cost **more pounds** than the price shown, because of the exchange rate.'

The man checks the exchange rate because he thinks his friend is wrong. He thinks that the number of pounds will be **less** than the number of dollars shown.

Exchange rate $\pounds 1 = \$1.24$

Who is right, the man or his friend?
Explain your answer.

Explanation

The man, as the number of dollars will be 1.24 times the number of pounds

(1 mark)

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Q7 A newspaper report says that a company made £700,000 profit last year. It says this was 12% more than the year before.

Work out how much profit the company made the year before.

Show all your working

$$\frac{700000}{100+12} \times 100$$

Let 100% be the full profit the year before. Adding 12% works out the percentage of the profit the year before it increases to for the profit last year. Dividing the profit last year by this works out 1%. Multiplying by 100 then works out the full 100%, which represents the profit the year before

Profit £ 625000

(3 marks)

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Q8

Income tax

Everyone can earn a certain amount of money without paying tax. This is called a Personal Allowance. They must pay tax on any earnings over this allowance.

Income tax Personal Allowance, 2018/2019	£11 850
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This formula gives the amount of Income tax a person pays in a year

$$T = 0.2 (y - p)$$

where T = income tax **for the year**

y = money earned per **year**

p = Personal Allowance

A caterer earns £1 375 per **month**.

How much income tax will she pay for the **year**?

Show all your working.

$$0.2(1375 \times 12 - 11850)$$

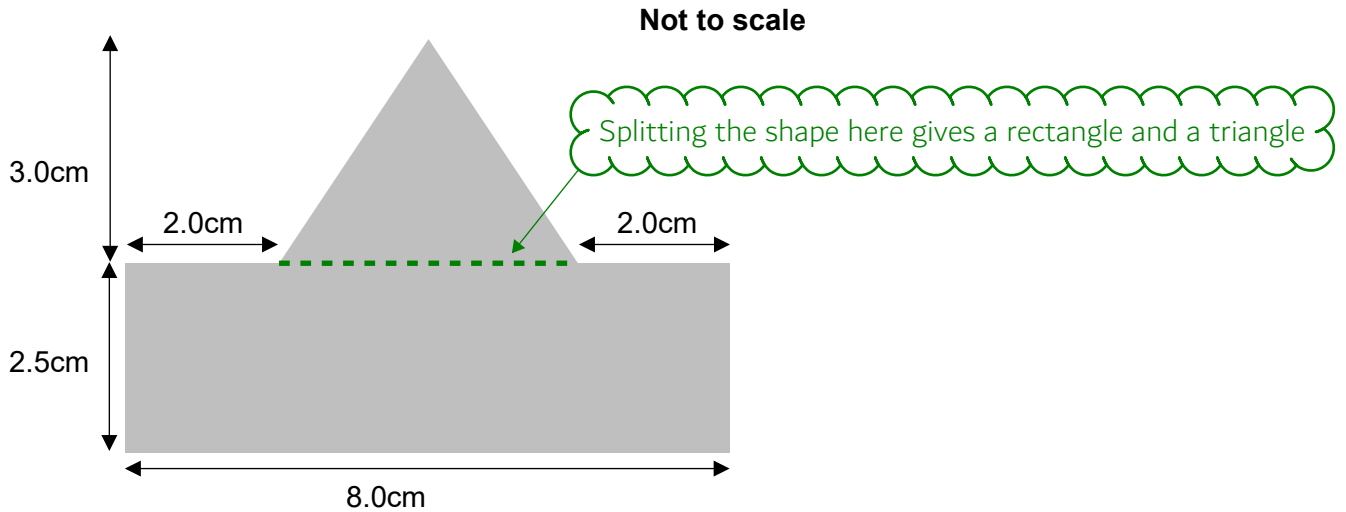
T represents the income tax for the year and is the subject of the formula, so the formula is telling us how to work it out. Substituting the money earned per year as y and the 11850 as p. The money earned per year is found by multiplying the monthly earnings by 12 as there are 12 months in a year

£ 930

(4 marks)

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Q9 A worker has to set a machine to cut this shape from a piece of metal.



What is the area of the shape?

Show all your working.

$$8 \times 2.5 + \frac{1}{2} \times (8 - 2 - 2) \times 3$$

Area of the rectangle. Area of rectangle = length \times width. The length is 8cm and the width is 2.5cm

Area of the triangle. Area of triangle = $\frac{1}{2} \times$ base \times height. The base is found by subtracting the two 2cm lengths from the 8cm length and the height is 3cm

The area of the shape is the area of the triangle added to the area of the rectangle

26 cm²

(4 marks)

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Q10 A photographer increases the price he charges to print photographs. He wants to know if this affects his sales.

Last week, before the price increase, the average number of photos ordered was 12.

This week customers ordered:

Photos ordered	Number of customers
1 - 10	26
11 - 20	14
21 - 30	6
31 - 40	4
41 - 50	0
51 - 60	0

Does the price increase seem to have had an effect on the number of prints ordered per customer? Explain your answer. Include calculations to support your decision.

Decision (yes/no) Yes

Explanation and supporting calculations

$$\frac{1+10}{2} \times 26 + \frac{11+20}{2} \times 14 + \frac{21+30}{2} \times 6 + \frac{31+40}{2} \times 4 = 13.1$$

$26+14+6+4$

Working out an estimate for the mean prints ordered per customer. Adding the lowest and highest number of photos in each category then dividing by 2 works out the midpoint of each category. The last two categories are ignored as there were no customers who ordered that many. Multiplying the midpoints by the frequencies for each category works out an estimate for the total number of photos ordered for each category. Adding all of the totals together gives an estimate of the total number of photos ordered. Dividing this by the total number of customers gives the mean prints ordered per customer

The average has increased

The average is now 13.1, which is different to the average last week which was 12. Therefore there does seem to have been an effect

(4 marks)

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Q11 This table shows how much a garage pays its staff.

Pay rates	
Working day	Rate
Monday to Friday	Normal rate
Saturday or Sunday	$1\frac{1}{4}$ x normal rate

Last week, a mechanic worked $7\frac{1}{2}$ hours each day from Monday to Saturday. She did not work on Sunday.

Her normal rate of pay is £10.80 an hour.

Work out her **total** pay for last week.

Show all your working

$$\underline{7\frac{1}{2} \times 5 \times 10.80} + \underline{7\frac{1}{2} \times 10.80 \times 1\frac{1}{4}}$$

The total pay for Monday to Friday. There are 5 days so multiplying the hours worked each day by 5 works out the total number of hours worked Monday to Friday. Multiplying this by the normal rate of pay per hour works out the total pay for Monday to Friday

The pay for Saturday. Multiplying the normal rate of pay per hour by the $1\frac{1}{4}$ works out the rate of pay per hour on Saturday. Multiplying this by the hours worked on Saturday works out the pay for Saturday

Adding the total pay for Monday to Friday and the pay for Saturday gives the total pay for last week

£ 506.25

Use approximation to check your answer.

Do your check here

$$8 \times 5 \times 10 + 8 \times 10 \times 1 = 480$$

Repeating the same calculation but rounding each number to 1 significant figure

(4 marks)

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Q12 A woman applies for a new job that pays £8.50 a week more (after tax).

She will work 5 days a week and drive to work, as she does in her job now.
The new job is 6 miles further from her house.

Her car travels 8.5 miles per litre of petrol
Petrol costs £1.26 per litre

Will the woman be better off with the new job after she takes the petrol into consideration?

Explain your answer. Include calculations to support your decision.

Decision (yes/no) No

Explanation and supporting calculations

$$\frac{2 \times 6 \times 5}{8.5} \times 1.26 = 8.89$$

The 6 miles extra distance is done twice a day as she must travel there and back so multiplying the 6 by 2 works out the extra miles done each day. Multiplying this by the 5 days works out how many extra miles are done each week. Dividing this by the 8.5 miles per litre of petrol works out how many lots of the 8.5 have been done extra and therefore how many extra litres of petrol are being used each week. Multiplying this by the cost of each litre of petrol works out the cost of the extra petrol

The cost of the petrol is more than the increase in pay

(4 marks)

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Q13 Your boss needs you to make some travel arrangements for him.

He will travel to Hull **4 days** every week for the next 6 months (26 weeks).

He needs to arrive at Hull at 8:30am and catch the train home at 5pm each day.

TRAIN TICKET PRICE INFORMATION

TRAINS TO HULL

TICKET TYPE:

DAY RETURN	£8.00
OFF-PEAK* DAY RETURN	£6.20

SEASON TICKETS VALID FOR:

ONE WEEK	£29.60
ONE MONTH	£113.70
ONE YEAR	£1 184.00

(Price for season ticket covers all travel while the ticket is valid)

* **OFF-PEAK** tickets are **not** valid for travel between 0700 and 0900 or between 1500 and 1900

Which ticket type do you recommend?

Recommendation

Season tickets valid for one month

As this is the cheapest cost

Explain your reasons. Include figures or calculations to support your decision.

Explanation and supporting calculations

Off-peak day return tickets cannot be used

As he will be travelling between between 0700 and 0900 or between 1500 and 1900

$$8 \times 4 \times 26 = 832$$

The total cost of using day return tickets

$$29.60 \times 26 = 769.60$$

The total cost of using season tickets valid for one week

$$113.70 \times 6 = 682.20$$

The total cost of using season tickets valid for one month

The total cost of using season tickets valid for one year is £1184

(5 marks)

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Q14 A company has made some changes to the way its employees work.

The manager wants to know if these changes have made any difference to the number of days employees take off work because of illness.

She can't just compare the total days as there are fewer people working in each department after the changes.

She gives you this information about the employees in one department.

Number of days each employee took off sick in the year BEFORE the changes			
14	12	11	8
12	0	15	6
11	3	10	7
0	5	8	10
15	16	14	3

Number of days each employee took off sick in the year AFTER the changes		
12	0	2
11	3	7
14	10	10
3	8	9
8	4	4

Did the changes make any difference to the average number of days that employees took off sick?

Explain your findings to the manager. Show calculations to support your explanation.

Decision (yes/no) Yes

Explanation and supporting calculations

$$\frac{180}{20} = 9$$

Mean is an appropriate type of average which can be used. Mean = total/number. Adding all of the number of days each employee took off sick in the year before the changes gives the total of 180. There were 20 employees so the number was 20

$$\frac{105}{15} = 7$$

Mean is an appropriate type of average which can be used. Mean = total/number. Adding all of the number of days each employee took off sick in the year after the changes gives the total of 105. There are 15 employees so the number is 15

The mean number of days that employees took off sick has decreased

(5 marks)

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Q15 A café owner wants to know how many cold drinks she is likely to sell next week.

She makes a record of sales of drinks over the last two weeks:

Day	M	T	W	Th	F	S	M	T	W	Th	F	S
Temperature (°C) at midday	17	18	17	19	20	20	19	19	22	23	20	20
Number of cold drinks sold	24	26	25	30	32	28	27	29	35	40	30	34
Number of hot drinks sold	34	36	32	34	27	29	37	39	25	25	28	28

She wants to use this information to see if she can predict the number of **cold** drinks she is likely to sell based on the temperature forecast for a particular day.

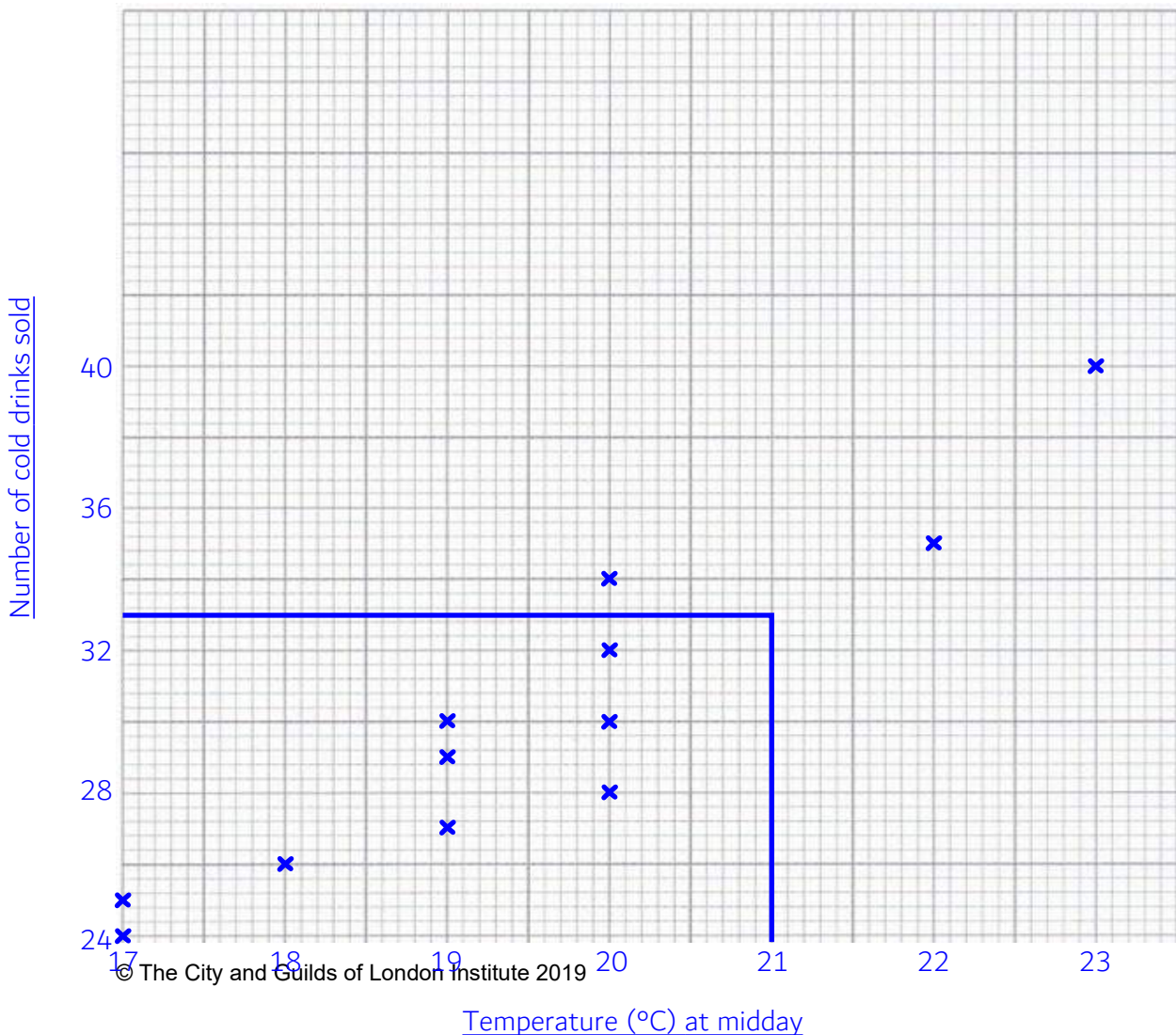
Use the graph paper to show clearly the data she has collected in a way that will help her to do this.

Space for working

$$\frac{23-17}{13} \rightarrow 0.5$$

$$\frac{40-24}{13} \rightarrow 2$$

Working out suitable scales for the temperature and number of cold drinks. The range divided by the number of large boxes works out what each large box could represent then rounding this up to a suitable amount which is easy to work with



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The weather forecast for next week says it will be 21°C on Monday.

What can you tell the café owner about how many cold drinks the café is likely to sell on Monday?
Show clearly on your graph paper how you found your answer.

Answer

Expect about 33 cold drinks to be sold

Drawing a line up from 21°C to a point which is roughly in the middle of the surrounding data points then across works out an estimate of how many cold drinks will be sold

(6 marks)

End of Section 2