

Duration: 1 hour 20 minutes

Total marks: 45 marks

.CG Maths.

Worked Solutions

SECTION 2 – CALCULATOR PERMITTED

Candidate name (first, last)

First	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>
Last	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>

Candidate enrolment number

<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>
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Date of birth (DDMMYYYY)

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Assessment date (DDMMYYYY)

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Centre number

<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>
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Candidate signature and declaration*

<input type="text"/>

- 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.**

Please check that your name is correctly printed on the candidate barcode label. If not, please tell the invigilator before the start of the exam.

You should have the following for this assessment

- a pen with black or blue ink
- a pencil
- an eraser
- a 30cm ruler
- a calculator

You must NOT use a protractor.



General instructions

- Read through each question carefully.
- You may use a dictionary.
- 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 at the back of this booklet if you run out of space or ask the invigilator if you need additional sheets of paper.

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

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.



Q1

What is 12% of £5300?

$$12/100 \times 5300$$

'Of' means to multiply. 12% is converted into a fraction

£ 636

(1 mark)

Q2

What is 23.3×0.463 correct to three decimal places?

$$23.3 \times 0.463 = 10.7879$$

The third decimal place is a 7 and this rounds up to an 8 as there is a 9 after it

10.788

(1 mark)

Q3

Which one of the following lists is in decreasing order?

(tick one box)

- | | | | | | | |
|---|-------------------|--------------------|-------------------|--------------------|-------------------------------------|------------------------------|
| A | $\frac{315}{100}$ | $\frac{1500}{924}$ | $\frac{200}{57}$ | $3\frac{2}{7}$ | <input type="checkbox"/> | 3.15, 1.6..., 3.5..., 3.2... |
| B | $\frac{200}{57}$ | $3\frac{2}{7}$ | $\frac{315}{100}$ | $\frac{1500}{924}$ | <input checked="" type="checkbox"/> | 3.5..., 3.2..., 3.15, 1.6... |
| C | $\frac{200}{57}$ | $\frac{1500}{924}$ | $3\frac{2}{7}$ | $\frac{315}{100}$ | <input type="checkbox"/> | 3.5..., 1.6..., 3.2..., 3.15 |
| D | $3\frac{2}{7}$ | $\frac{1500}{924}$ | $\frac{315}{100}$ | $\frac{200}{57}$ | <input type="checkbox"/> | 3.2..., 1.6..., 3.15, 3.5... |

$$\begin{aligned} 315/100 &= 3.15 \\ 1500/924 &= 1.6... \\ 200/57 &= 3.5... \\ 3^2/7 &= 3.2... \end{aligned}$$

(1 mark)

Q4



What is the price of the phone before VAT of 20% is added?

$$\frac{240}{100+20} \times 100$$

Let 100% be the original value. Adding 20 to the 100 works out the percentage it has risen to. Dividing by this works 1% of the original value. Multiplying by 100 works out 100%, the original value

£200

(1 mark)

Q5

The results for a local election were

Candidate One	602	votes
Candidate Two	553	votes
Candidate Three	350	votes

What fraction of the votes did the winner get?

Give your answer in its simplest form.

$$\frac{602}{602 + 553 + 350}$$

2

5

(1 mark)

The winner got 602 votes as this is the most out of the candidates. Adding the number of votes for each candidate gives the total number of votes. Expressing the 602 as a fraction of this. The calculator gives the fraction in its simplest form

Q6

A parent fills in a medical form about her 2-year-old child.

The parent measures her child's height with a tape measure and writes that the child is 3m tall.

The receptionist at the surgery thinks that the parent has made a mistake.

Is the receptionist correct?

Is the receptionist correct? (tick one box) Yes ☒ No ☐

Explanation

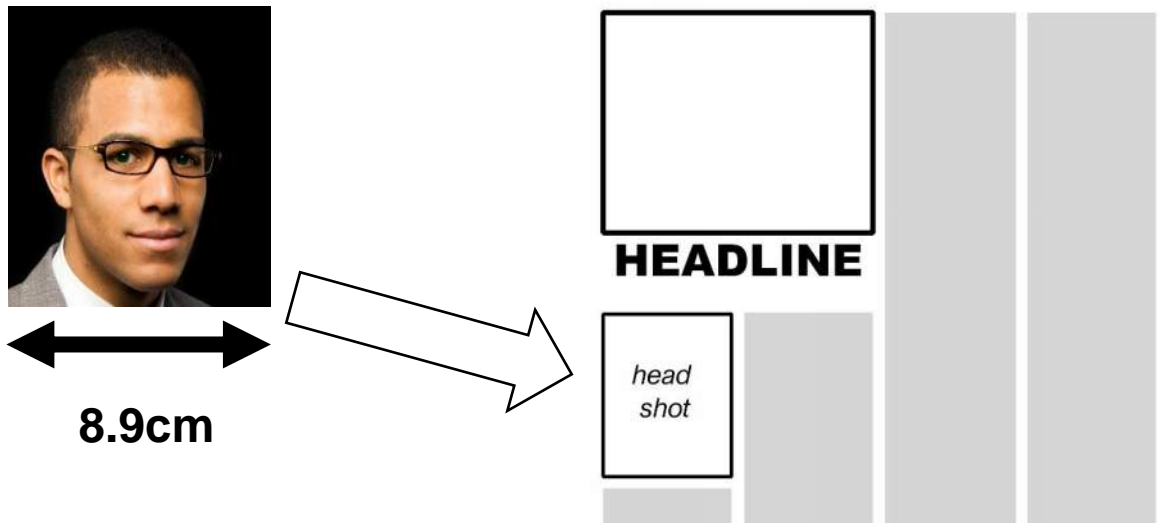
3m is too tall for a child

3m is about the height of the ceiling in a typical room

(1 mark)

Q7

An editor needs to change the width of this photo to fit in a magazine.



The photo needs to be 32 mm wide.

What percentage of the original width will the changed photo be?

Show your working

$$\frac{32}{8.9 \times 10} \times 100$$

There are 10mm in 1cm so multiplying the 8.9 by 10 converts it into millimetres so that now it is the same unit as the 32mm. Expressing the 32 as a fraction of this then converting it into a percentage by multiplying by 100. There is no need to quote the whole decimal so it has been rounded to two decimal places

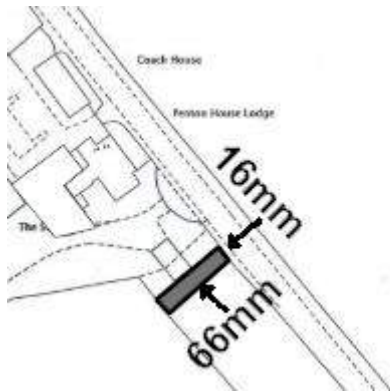
35.96 %

(2 marks)

Q8

An estate agent needs to know the area of a plot of building land.

This plan shows the building land.



Scale 1:1250

■ = building land for sale

What is its area?

Show your working

$$\frac{16 \times 1250}{1000} \times \frac{66 \times 1250}{1000}$$

The 1250 is 1250 times greater than the 1 part representing the plan. So multiplying the measurement on the plan by 1250 works out the actual distance in millimetres. There are 1000mm in 1m so dividing the distance in millimetres by 1000 converts it into metres, which needs to be done as the area needs to be in square metres. Area of rectangle = length x width

1650 m²

(3 marks)

Q9

An architect designs a shop refit.

The architect needs to work out the weight of an oak panel.

The oak panel measures 0.06 m x 0.9 m x 1.5 m

The density of oak is 700 kg per m³

What is the weight of the oak panel in kg?

Show your working

d^m_v

Writing the formula triangle for density, mass, volume

$$700 \times 0.06 \times 0.9 \times 1.5$$

Weight of the oak panel 56.7 kg

Multiplying the density by the volume in cubic metres works out the mass in kilograms. The oak panel can be assumed to be a cuboid and volume of cuboid = length x width x height. As each of the lengths is already given in metres there are no conversions of units needed

(3 marks)

Q10

A cook needs to cook a turkey to be ready by 6pm.

The cook will start cooking the turkey at 1:30pm

Turkey needs to be cooked for 45 minutes per kg of total weight plus 20 minutes and then left to rest for 45 minutes.

The cook has a 4.4kg turkey.

Has the cook allowed enough time? Explain your answer using figures.

Show your working

Has the cook allowed enough time? (tick one box) Yes ☒ No ☐

Explanation

$$1:30 + (0:45 \times 4.4 + 0:20 + 0:45)$$

It will be ready at 5:53pm

Adding the time needed to the starting time works out what time it will be ready. Multiplying the 45 minutes by the 4.4kg then adding the extra 20 minutes and adding the 45 minutes required to rest works out the time needed

Time can be put in the calculator. It will give the result of 5:53'0", which can be read as 5 hours and 53 minutes and 0 seconds

(4 marks)

Q11

A cafe makes its own coffee blend by mixing different coffee beans together.

It uses Brazilian beans and Kenyan beans in a ratio of 4:1

The manager needs to mix enough beans to make **120 cups of coffee**.

Each cup of coffee needs 85g of beans.

He needs to know what weights of beans to use.

What are the weights of the beans he needs?

Show your working

$$\left(\frac{85}{1000} \right) \times 4 \times 120$$

$$\left(\frac{85}{1000} \right) \times 1 \times 120$$

Brazilian beans 8.16 kg

Kenyan beans 2.04 kg

(4 marks)

There are 1000g in 1kg so dividing the 85g by 1000 converts it into kilograms. Dividing this by the total amount of parts in the ratio (which is found by adding the 4 and the 1) then multiplying by 4 to work out the number of kilograms needed of Brazilian beans in each cup and by 1 to work out the number of kilograms needed of Kenyan beans in each cup. Multiplying both of these by 120 works out the total number of kilograms of each type of bean needed for 120 cups

Q12

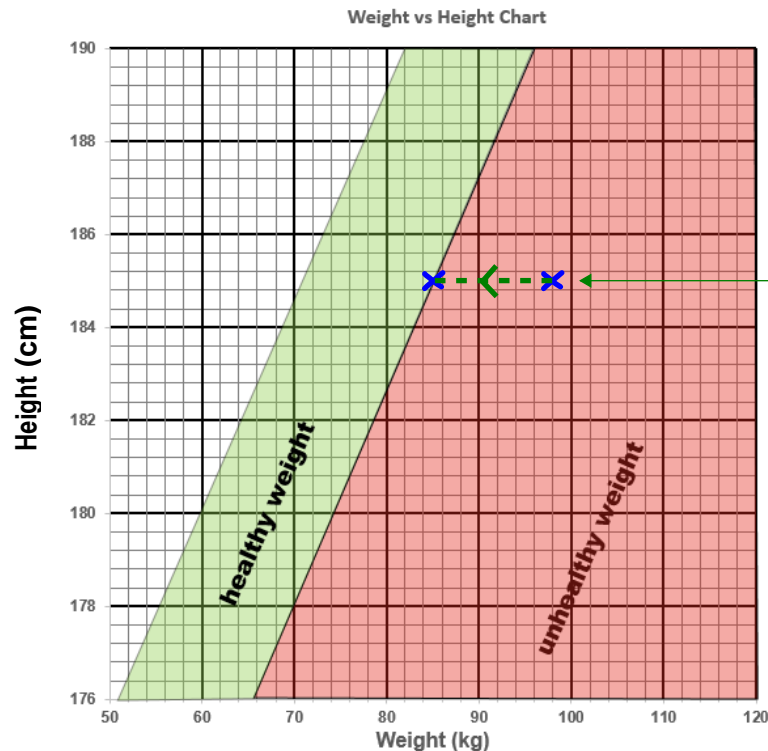
A man is 185cm tall and weighs 98kg. He wants to reach a healthy weight.

A doctor says he can lose 0.75kg a week if he follows a diet **and** exercises to burn 600 calories a week.

He plans his diet and decides to use Yoga exercise to burn 600 calories a week.

He will use one-hour Yoga classes that burn 200 calories. Each class costs £6.

He has £360 he can spend on Yoga classes



He needs to go from 98kg to 85kg to be a healthy weight

Does he have enough money to pay for the Yoga classes?

Explain your answer using figures.

Show your working

$$\frac{98-85}{0.75} \times 600 \div 200 \times 6$$

Does he have enough money? (tick one box) Yes ☒ No ☐

Explanation

He will need £312

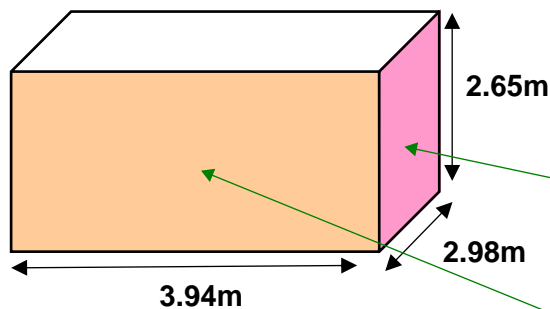
98 - 85 works out the difference in the weights and therefore how much weight he needs to lose. Dividing this by the 0.75kg each week works out how many lots of the 600 calories need to be burned. Multiplying this many lots by the 600 calories works out how many calories need to be burned. Dividing this by the 200 calories burnt in each yoga class works out how many yoga classes are needed. Multiplying this by the £6 cost of each yoga class works out the cost of the yoga classes in total

(5 marks)

Q13

A house tenant has a budget of £75 to redecorate a room.

The room has two walls 2.98m long and 3.94m long and the wall is 2.65m high.



Sketch of room

Not to scale

The short wall. The wall opposite is also a short wall and is identical to this one

The long wall. The wall opposite is also a long wall and is identical to this one

She wants to paint one long wall and one short wall.

She wants to put wallpaper on the other short and long walls.

A 2.5L tin of paint costs £16 and covers 30m^2

A roll of wallpaper is 52cm wide and 10 m long.



Can the tenant decorate the room for the budget set?

Explain your answer using figures.

Can the tenant decorate the room for the budget set? (tick one box)

Yes



No



Show your working

$$\frac{3.94 \times 2.65 + 2.98 \times 2.65}{30} \rightarrow 1$$

$$1 \times 16 + 4 \times 10$$

$$\frac{3.94 \times 2.65 + 2.98 \times 2.65}{\frac{52}{100} \times 10} \rightarrow 4$$

Converting the 52cm to metres.
Length x width of the roll gives its area

Explanation It will cost £56, which is less than the £75 budget

Area of rectangle = length x width. So 3.94×2.65 works out the area of one long wall and 2.98×2.65 works out the area of one short wall, both in square metres. Adding these together gives the area needed to be painted and also the area needed to be covered in wall paper, both in square metres. Dividing by the area covered by a tin of paint and the area covered by a roll of wall paper in square metres works out how many tins and rolls are needed. These are rounded up to the next whole number. Multiplying the number of tins and rolls by the cost of each and adding both together works out the total cost to redecorate

(6 marks)

20

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Q14

A vet nurse in a pet rescue centre records weights and ages of kittens brought to the centre.

Weights and ages of kittens brought to the centre				
weight (g)	age (days)		weight (g)	age (days)
600	50		660	50
340	28		720	56
480	42		420	28
360	20		180	14

$$\frac{720-180}{11} \rightarrow 50$$

$$\frac{56-14}{11} \rightarrow 5$$

One day the centre receives an abandoned kitten. It weighs 460g

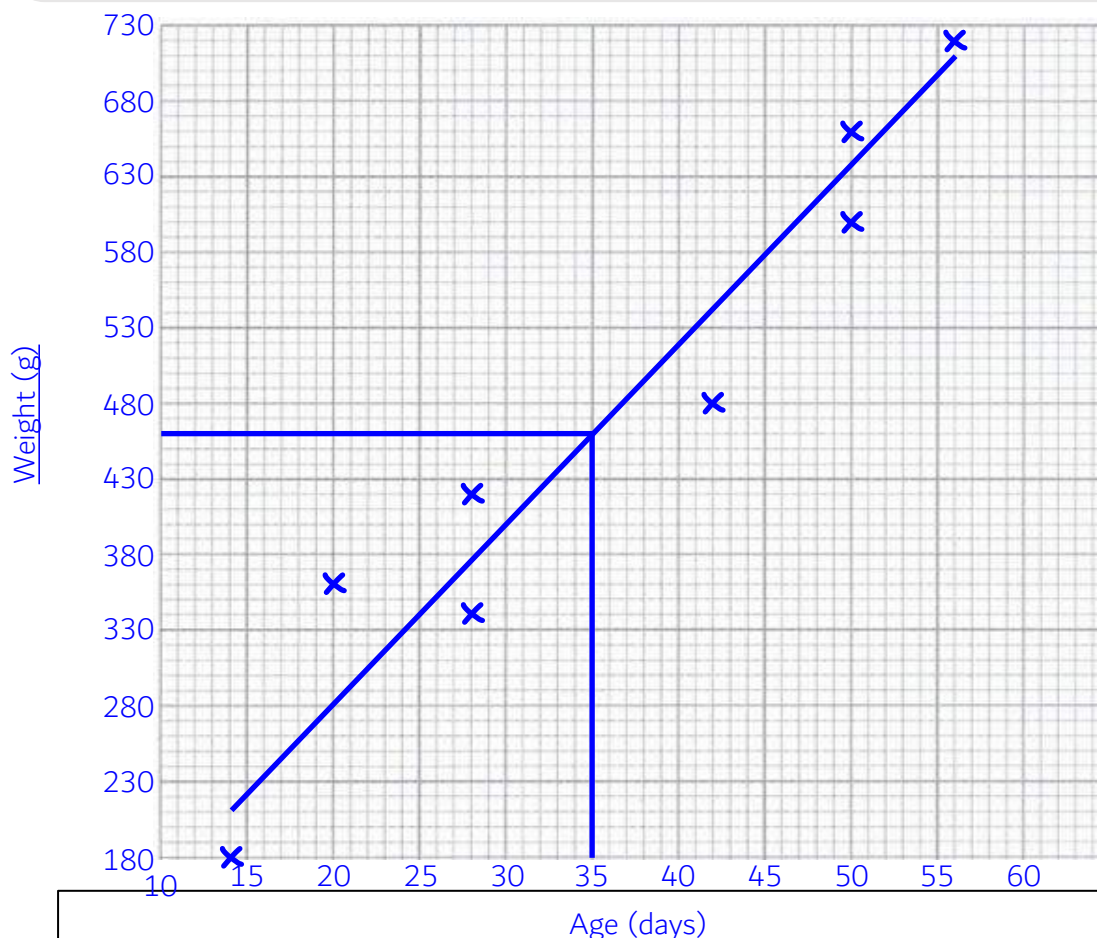
The nurse needs to estimate the age of the kitten.

Draw a suitable graph and trend line.

Estimate the age of the abandoned kitten.

Show on the graph how you made the estimation.

Dividing the range of the range of the weights and ages by the number of large squares on the grid works out what each large square could represent. Rounding up to a suitable scale



Estimated age of rescued kitten 5 weeks

Reading across from 460g to the trend line then down estimates the age is 35 days. There are 7 days in a week and $35/7 = 5$ so the estimated age is 5 weeks

(5 marks)

21

Q15

A city council wants to encourage car sharing to cut pollution.

It takes a survey of cars entering the city and find these results.

Average people in a car entering the city	
Mean	Mode
1.65	1

It introduces a congestion charge for cars with only one person in the car.

It wants to know if the congestion charge is effective in making people share cars.

It takes another survey of the number of people in cars entering the city.

Number of people in a car	Number of cars after the congestion charge is introduced (frequency)
1	17
2	54
3	14
4	8
5	2
6+	0

Is the congestion charge effective?

Make two comments using the figures provided

Is the congestion charge effective? (tick one box) Yes ☒ No ☐

Show your working $\frac{1 \times 17 + 2 \times 54 + 3 \times 14 + 4 \times 8 + 5 \times 2}{17 + 54 + 14 + 8 + 2} = 2.2$

Comment 1

The mode has increased to 2

Comment 2

The mean has increased to 2.2

The mode is now 2 as this had the highest number of cars. The mean is calculated by multiplying the number of people in each car by the number of cars to get the total number of people in each category, adding these all together to get the overall total number of people then dividing by the total number of cars

(6 marks)