AQA

Please write clearly in block capitals.

Centre number

Candidate number

Surname

Forename(s)

Candidate signature
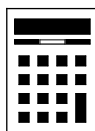
GCSE
MATHEMATICS

F

Foundation Tier   Paper 3 Calculator

Wednesday 8 November 2017   Morning   Time allowed: 1 hour 30 minutes

Materials

For this paper you must have:
- a calculator
- mathematical instruments.

Instructions

- Use black ink or black ball-point pen. Draw diagrams in pencil.
- Answer **all** questions.
- You must answer the questions in the spaces provided. Do not write outside the box around each page or on blank pages.
- Do all rough work in this book. Cross through any work you do not want to be marked.

Information

- The marks for questions are shown in brackets.
- The maximum mark for this paper is 80.
- You may ask for more answer paper, graph paper and tracing paper. These must be tagged securely to this answer book.

Advice

- In all calculations, show clearly how you work out your answer.

For Examiner's Use	
Pages	Mark
2–3	
4–5	
6–7	
8–9	
10–11	
12–13	
14–15	
16–17	
18–19	
20–21	
22–23	
24–25	
TOTAL	

8300/3F

Please note that these worked solutions have neither been provided nor approved by AQA 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

.CG Maths.

Answer **all** questions in the spaces provided

1 Circle the cube number.

[1 mark]

100 1000 10 000 100 000

Cube rooting each of the numbers shows if they are cube numbers as they can be cube rooted to get a whole number

2 A fair ordinary dice is thrown once.

Circle the probability of getting a 2 or a 3

[1 mark]

$\frac{1}{6}$ $\frac{2}{6}$ $\frac{3}{6}$ $\frac{5}{6}$

There are 6 faces on a fair ordinary dice. Out of these, 2 of them are a 2 or a 3

3 Circle the decimal that is greater than $\frac{1}{5}$ and less than $\frac{1}{4}$

[1 mark]

0.152 0.200 0.215 0.251

Enter the fraction, press = then press the SD button to convert them into decimals

4   What is a **litre** a unit of?

Circle your answer.

[1 mark]

~~area~~   density   ~~mass~~   capacity

5   2.5 kg of carrots cost £1.70

Work out the cost of 3.25 kg of carrots.

[3 marks]

Dividing the £1.70 by the 2.5kg works out the cost of 1kg of carrots.
Multiplying this by the 3.25kg works out the cost of 3.25kg of carrots

Answer £ _____

Turn over for the next question

Turn over ▶

.CG Maths.

6 Gina makes a sandwich using

bread (B) or a roll (R)

and

ham (H) or cheese (C)

and

salad (S) or pickle (P)

6 (a) List **all** the possible types of sandwich Gina could make.
One has been done for you.

[2 marks]

B H S

Use systematic listing

6 (b) What **fraction** of the possible types of sandwich have cheese **and** pickle?
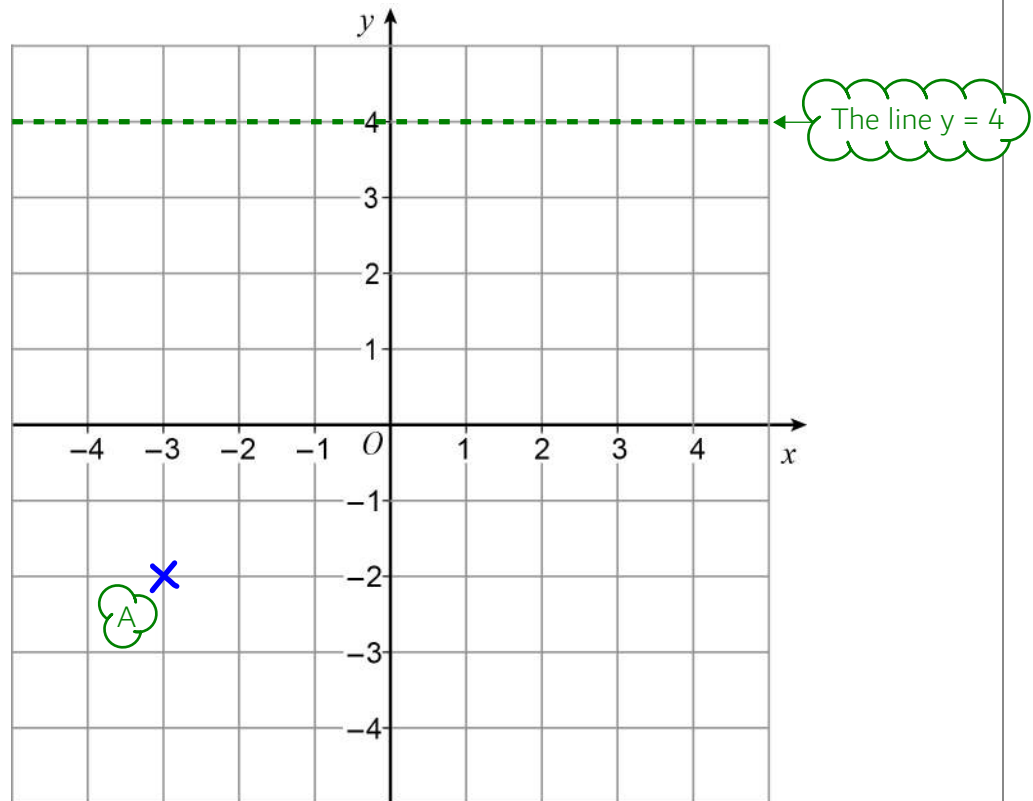
[1 mark]

Answer _____

$$\frac{\text{Number of types of sandwich with cheese and pickle}}{\text{Number of types of sandwich}}$$

.CG Maths.

7   *ABC* is a right-angled triangle.

   A is the point (–3, –2)

   B is the point (1, –2)

   C is a point on the line *y* = 4

7 (a)   Draw triangle *ABC* on the centimetre grid below.

[3 marks]

The line y = 4

A

7 (b)   Work out the area of triangle *ABC*.

[2 marks]

Area of triangle = 1/2 x base x height

Answer _____ cm^2

8

Turn over ▶

0 5

8 (a) Complete the number machine so that $q = 7r - 2$

Input

Output

r

q
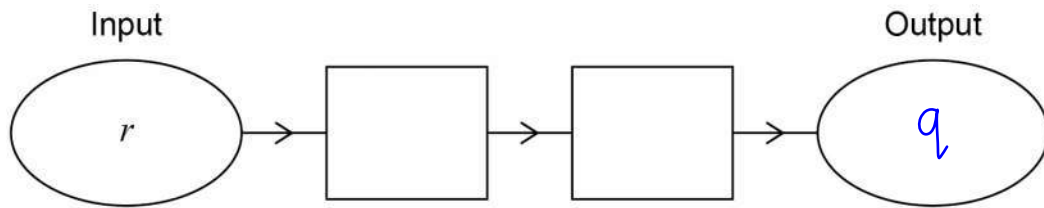
r is multiplied by 7 then has 2 subtracted from the result

[2 marks]

8 (b) Write down the output y in terms of x.

Input

Output
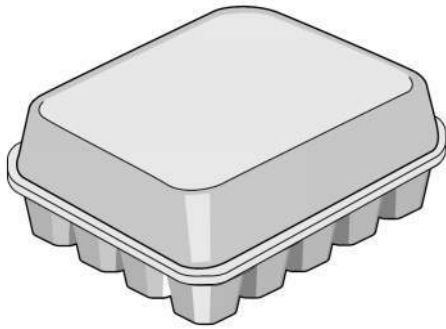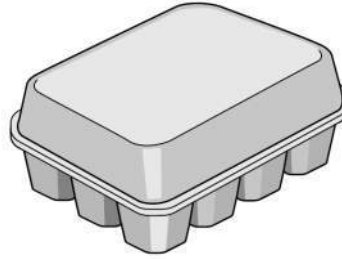
x

+5

×3

y
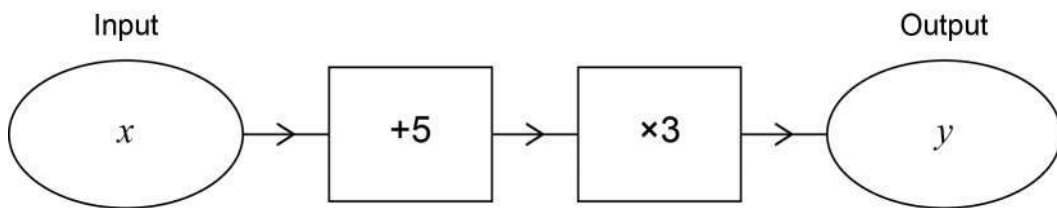
[1 mark]

Answer _____

Brackets will be needed as the addition is done first then all of the result is multiplied by 3

.CG Maths.

9 A farmer has 580 eggs to put into boxes.

The boxes come in three sizes.

20 eggs   12 eggs   6 eggs

He wants

at least 10 boxes of 20 eggs

at least 15 boxes of 12 eggs

at least 25 boxes of 6 eggs.

The farmer fills 54 boxes with the 580 eggs.

Show how he does this.

[5 marks]

Subtracting the numbers of boxes filled so far from the total of 54 boxes works out how many more boxes need to be filled. Subtracting the number of eggs used so far from the total of 580 eggs works out how many more eggs are in the extra boxes. Multiplying the number of boxes by the number of eggs in each box works out the number of eggs used. There is only one way of filling the number of extra boxes with the number of extra eggs needed

Answer _____ boxes of 20 eggs

_____ boxes of 12 eggs

_____ boxes of 6 eggs

8

Turn over ▶

.CG Maths.

10 Megan says,

"If you add any three multiples of 10 the total must be

a multiple of 10

and

a multiple of 3"

Is she correct?

You **must** show your working.

[2 marks]

Give an example to show that adding three multiples of 10 is not a multiple of 3. Multiples of 10 are in the 10 times table and include 10, 20, 30...

Answer _____ No _____

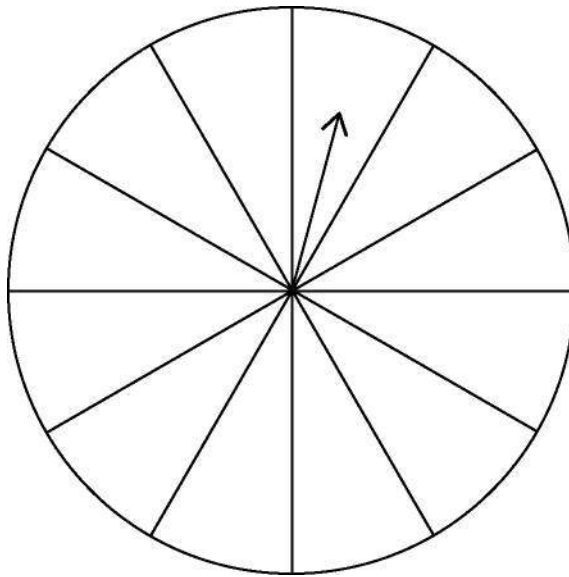**.CG Maths.**

11 A fair spinner has 12 equal sections.

Label each section A, B, C or D so that when the arrow is spun,

the probability it lands on A is $\frac{1}{6}$

the probability it lands on B is **equal** to the probability it lands on C

the probability it lands on D is **double** the probability it lands on A.

[3 marks]

Work out 1/6 of 12 to work out how many As there are. There are twice as many Ds. The remaining sections can be divided equally between the Bs and Cs

Turn over for the next question

5

Turn over ▶

12 $a - b = 5$

12 (a)   Work out the value of $2(a - b)$

[1 mark]

It is 2 lots of (a - b)

Answer _____

12 (b)   Work out the value of $7a - 7b$

[1 mark]

7 can be brought out as a factor to give 7(a - b)

Answer _____

12 (c)   Work out the value of $b - a$

[1 mark]

a could be 7 and b could be 2

Answer _____

.CG Maths.

13 A cube has edge length 0.9 metres.

0.9 m
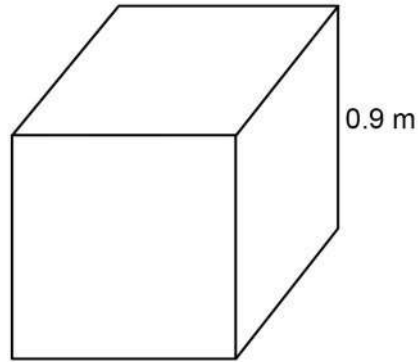
Work out the **total** surface area of the cube.

Give your answer in **square centimetres**.

[3 marks]

There are 100cm in 1m. Use this fact to convert the side length into centimetres.
Area of square = length². There are 6 identical square faces on a cube

Answer _____ cm²

Turn over for the next question

6

Turn over ▶

.CG Maths.

14   £1700 is invested for 3 years at 4% per year **simple** interest.
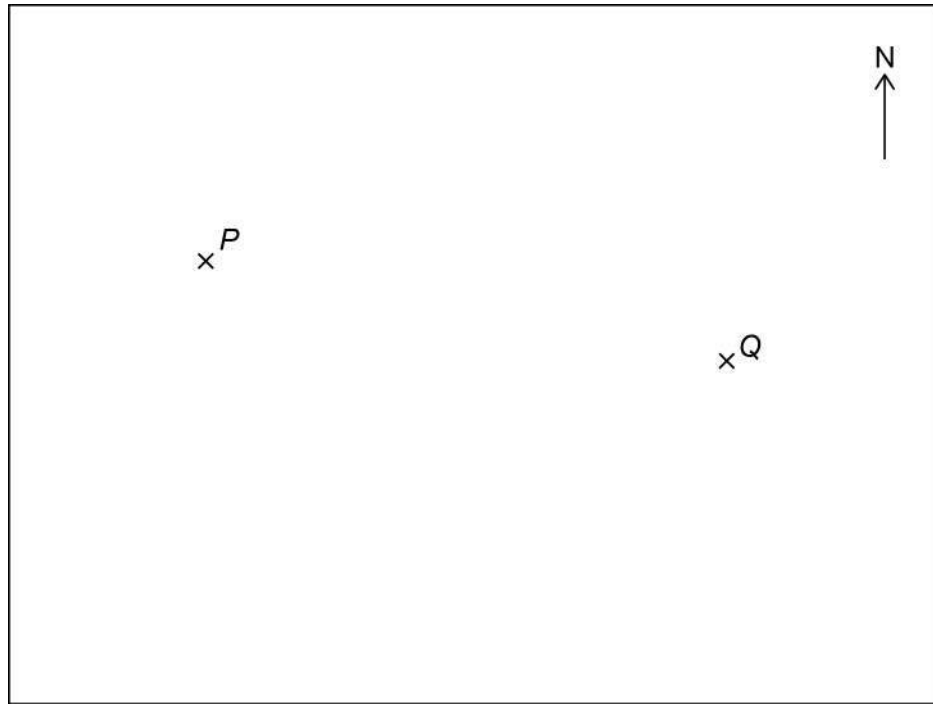
Work out the total interest.

[3 marks]

4 x 3 works out the total percentage interest. Putting this over 100 converts it into a fraction multiplier. Multiplying this by the £1700 finds the interest

Answer £ _____

.CG Maths.

15   Here is a map showing two towns, *P* and *Q*.

Scale: 1 cm represents 50 km

15 (a)   Work out the **actual** distance between towns *P* and *Q*.

[2 marks]

Measure the distance between P and Q on the map then multiply the distance in centimetres by 50 to convert it into the actual distance in kilometres

Answer _____ km

15 (b)   Town *R* is 200 km due South of town *P*.

Mark *R* on the map.

[2 marks]

Every 50km is represented by 1cm so dividing the 200km by 50 works out how many lots of 50 it is and therefore how many centimetres represent it

7

Turn over ▶

.CG Maths.

16 A train has 1 first-class carriage and 6 standard carriages.

The first-class carriage has 64 seats.

$\dfrac{3}{8}$ are being used.

Each standard carriage has 78 seats.

$\dfrac{7}{13}$ in each carriage are being used.

Are **more than** half the seats on the train being used?

You **must** show your working.

[5 marks]

Adding the number of seats being used in the first-class carriage to the number of seats being used in the standard carriages works out how many seats are being used. Subtracting half of the total number of seats works out how many more seats are being used than half of them. If the the result is positive, there are more than half of the seats being used. To work out a fraction of an amount, multiply the amount by the fraction

Answer _____

17   Circle the equation which has the solution $x = 6$

[1 mark]

$$x - 3 = \frac{x}{2} \qquad x = \frac{3 + x}{2} \qquad 3x = 36 \qquad \frac{x}{6} = 0$$

> Substitute x for 6 in each of these equations. Only one of the equations is satisfied (meaning that the equation works) so the correct equation must be this one

18 x is greater than 5 **and** less than or equal to 9

Circle the inequality that shows this.

[1 mark]

$$5 \leqslant x < 9 \qquad 5 > x \geqslant 9 \qquad 5 \leqslant x > 9 \qquad 5 < x \leqslant 9$$

> The inequality symbol points toward the smaller amount. If there is a line underneath it can also be equal

Turn over for the next question

7

Turn over ▶

.CG Maths.

1 5

19 The following data comes from a large sample survey of the audience at a concert.

	Percentage	Mean age (years)	Age range (years)
Male	17%	20.3	6
Female	83%	25.7	28

Make **three** comparisons of males and females at the concert.
Use the headings given.

[3 marks]

Proportion of the audience _____

Compare the percentages

Average age _____

Compare the means

Spread of ages _____

Compare the ranges

.CG Maths.

20 In a tennis tournament,
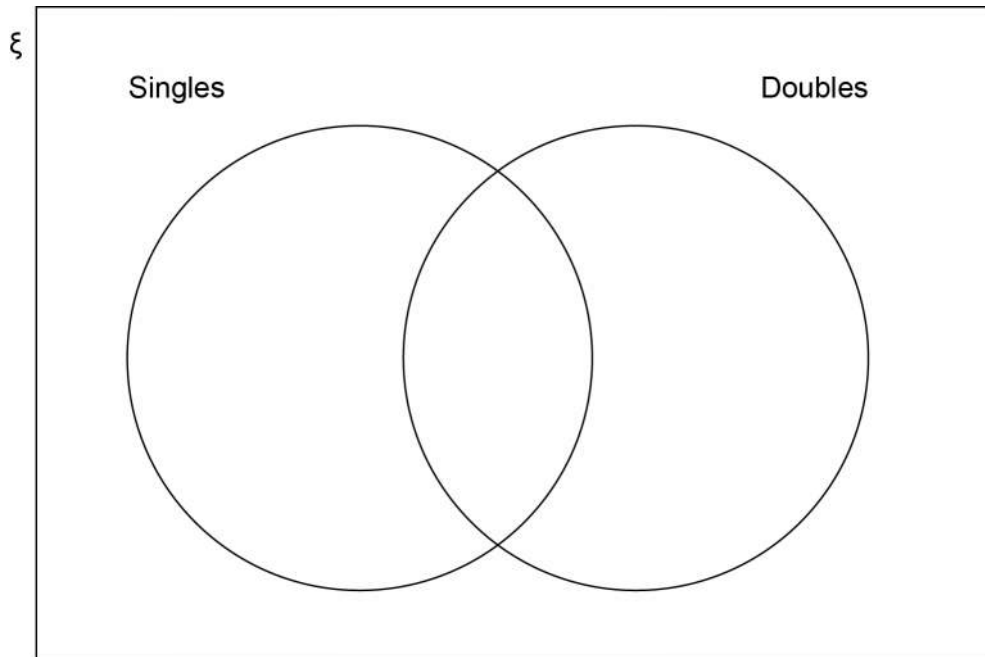
98 players took part in the singles only

34 players took part in the doubles only

twice as many players took part in the singles as took part in the doubles.

How many players took part in both the singles **and** the doubles?
You may use the Venn diagram to help you.

[4 marks]

ξ

Singles   Doubles

Let x be the number of players who took part in both the singles and the doubles. 98 + x is the number of players who took part in the singles in total. x + 34 is the number of players who took part in the doubles in total. Doubling this number makes it equal to the number of players who took part in the singles in total. Create an equation using this information then expand any brackets and rearrange to find x

Answer _____

Turn over ▶

.CG Maths.

7

21 The distance by road from Newport to London is 140 miles.

Tom travels by coach from Newport to London.
The coach leaves Newport at 1.30 pm

21 (a) He assumes the coach will travel at an average speed of 50 mph

Use his assumption to work out the arrival time in London.

[3 marks]

$s \frac{d}{t}$

This is a speed, distance, time problem so writing the formula triangle

Working out the time taken in hours for the journey then adding this to the original time works out the arrival time

FACT B
◦, ,, Enter 1:30 by pressing 1, then the button on the left, then 30, then the button on the left again. It should appear as 1°30°. This button can also be pressed to convert the answer in hours into time

Answer _____

21 (b) In fact, the coach has a lower average speed.

How does this affect the arrival time?

[1 mark]
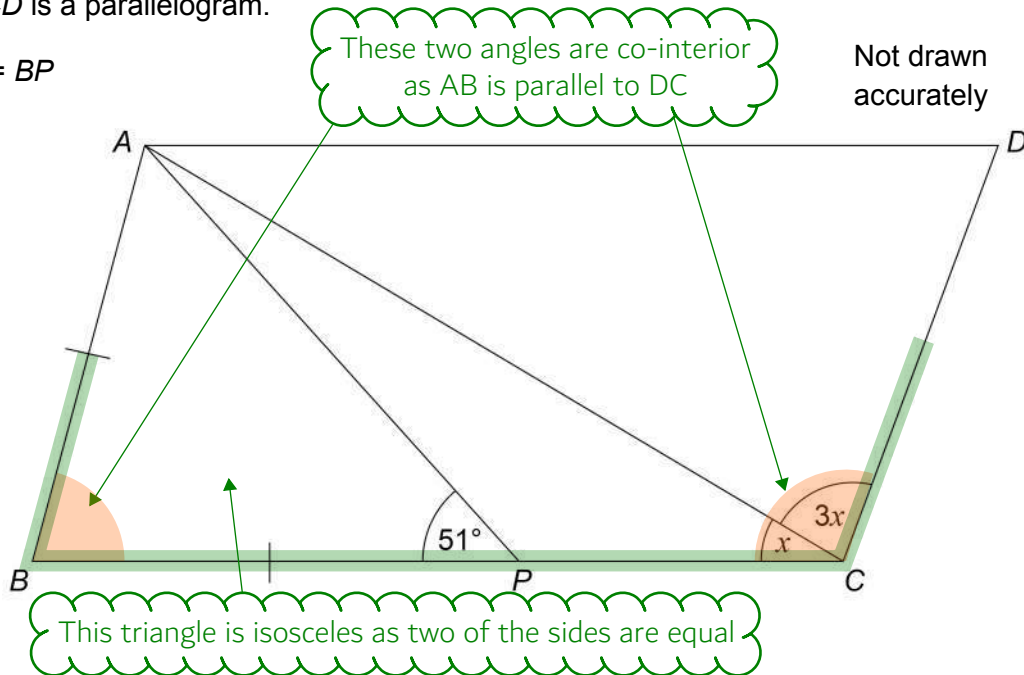
Consider how the time was calculated and what effect reducing the speed will have. If the time is increased, the arrival time will be later

.CG Maths.

22 *ABCD* is a parallelogram.

AB = BP

These two angles are co-interior as AB is parallel to DC

Not drawn accurately

51°

3x

x

A

D

B

P

C

This triangle is isosceles as two of the sides are equal

Work out the size of angle *x*.

[4 marks]

Base angles of an isosceles triangle are equal. The angles in a triangle add up to 180. Co-interior angles add up to 180

Answer _____ degrees

Turn over for the next question

23 Show that 268 can be written as the sum of a power of 3 and a square number.

[2 marks]

Enter table mode by pressing MENU then 3. f(x) = 268 - 3^x. Ignore g(x). Start: 1. End: 30. Step: 1

Subtracting the powers of 3 from 268 until the result is a square number

Answer _____

24 y is inversely proportional to x and k is a constant.

Circle the correct equation.

[1 mark]

$$y = \frac{k}{x} \qquad y = kx \qquad y = \frac{x}{k} \qquad y = x - k$$

For it to be inversely proportional, doubling x must half y

25

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

Work out the **force** when the pressure is 24 N/m^2 and the area is 3 m^2
Circle your answer.

[1 mark]

0.125 N   8 N   27 N   72 N

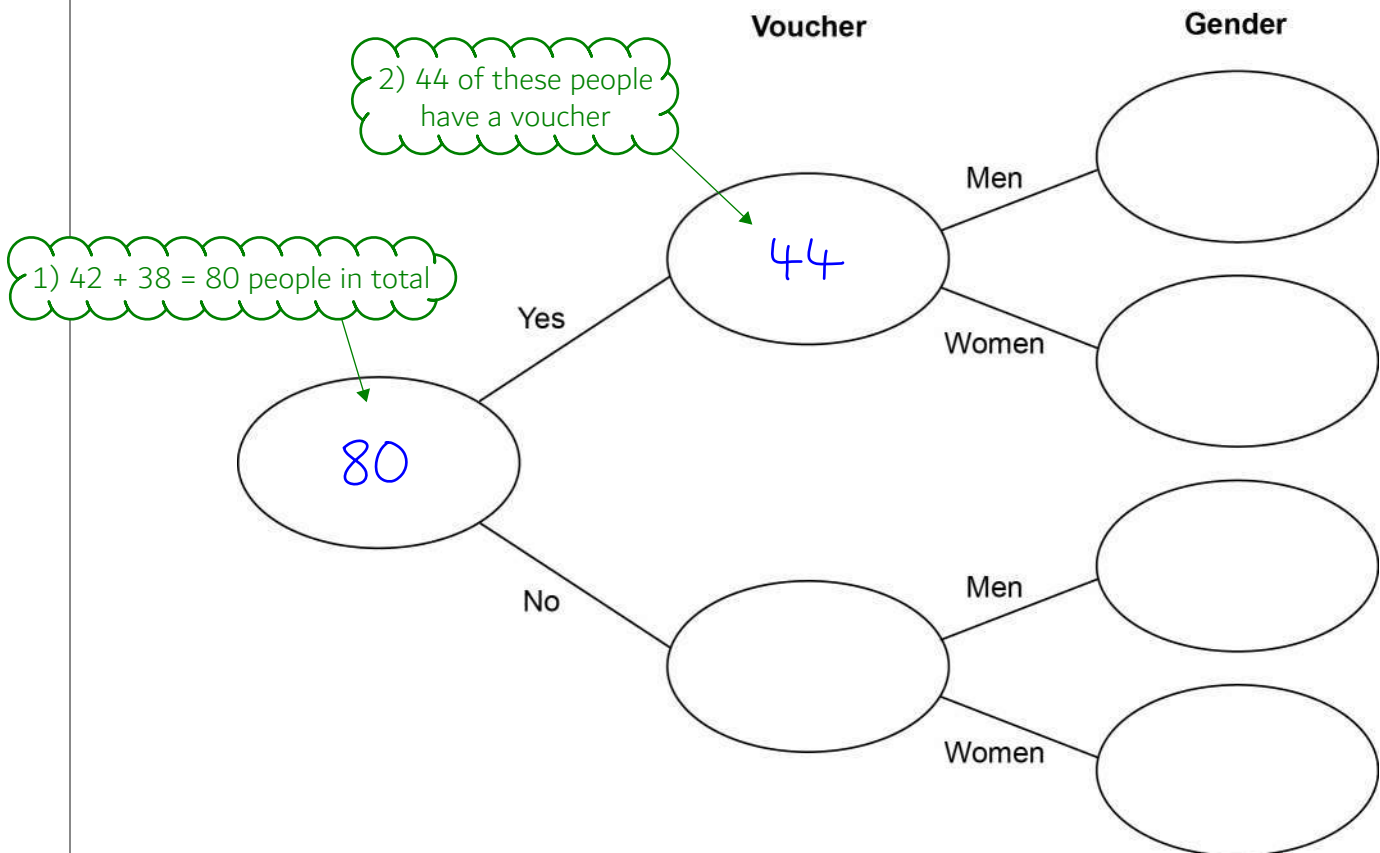Rearrange the formula to find the force then substitute in the pressure and area

Turn over for the next question

4

Turn over ▶

.CG Maths.

26   42 men and 38 women visit a restaurant.

              44 of these people have a voucher.

              Three times as many men as women do **not** have a voucher.

26 (a)   Complete the frequency tree.

[4 marks]

Voucher   Gender

2) 44 of these people have a voucher

1) 42 + 38 = 80 people in total

Yes   **44**   Men

                                           Women

80

No   Men

                                           Women

The ratio of men who do not have a voucher to women who do not have a voucher is 3 : 1. Divide the the number who do not have a voucher into this ratio to work out how many men and women do not have a voucher

26 (b) A voucher takes **15% off** the bill.

After using the voucher, the bill for a meal is £27.20

How much was the bill before using the voucher?

[3 marks]

100 - 15 works out the percentage of the price of the meal it has reduced to. Dividing by this percentage works out 1%. Multiplying by 100 works out 100%, which is the price before the voucher was used

Answer £ _____

Turn over for the next question

.CG Maths.

7

27 (a) Rearrange $v = u + at$ to make t the subject of the formula.

[2 marks]

Follow the order of operations, BIDMAS, backwards and do the opposite operations to both sides to eliminate everything apart from t on the right side

Answer _____

27 (b) Complete this table with consistent metric units.

[2 marks]

Distance	Time	Speed	Acceleration
m	s		

Speed = distance/time. Dividing the metres by seconds give the unit of speed.

Acceleration = (change in speed)/(change in time). Dividing the unit of speed by seconds gives the unit of acceleration

.CG Maths.

28   Multiply out and simplify $(x-8)^2$

[2 marks]

$(x-8)(x-8)$

Answer _____

END OF QUESTIONS

6

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