

Please write clearly in block capitals.

Centre number

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Candidate number

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Surname

Forename(s)

Candidate signature

GCSE MATHEMATICS

F

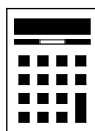
Foundation Tier Paper 3 Calculator

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.

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	

Advice

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



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

Answer **all** questions in the spaces provided

1 Circle the cube number.

[1 mark]

100

1000

10 000

100 000

$$\sqrt[3]{1000} = 10$$

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.
 $1/5 = 0.2$. $1/4 = 0.25$

0.215 is the only one which is
above 0.2 and less than 0.25



- 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]

$$\frac{1.70}{2.5} \times 3.25$$

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 £ _____

2.21

Turn over for the next question

Turn over ►



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 BHP, BCS, BCP, RHS, RHP, RCS, RCP

Using systematic listing

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

[1 mark]

Answer _____

$\frac{2}{8}$

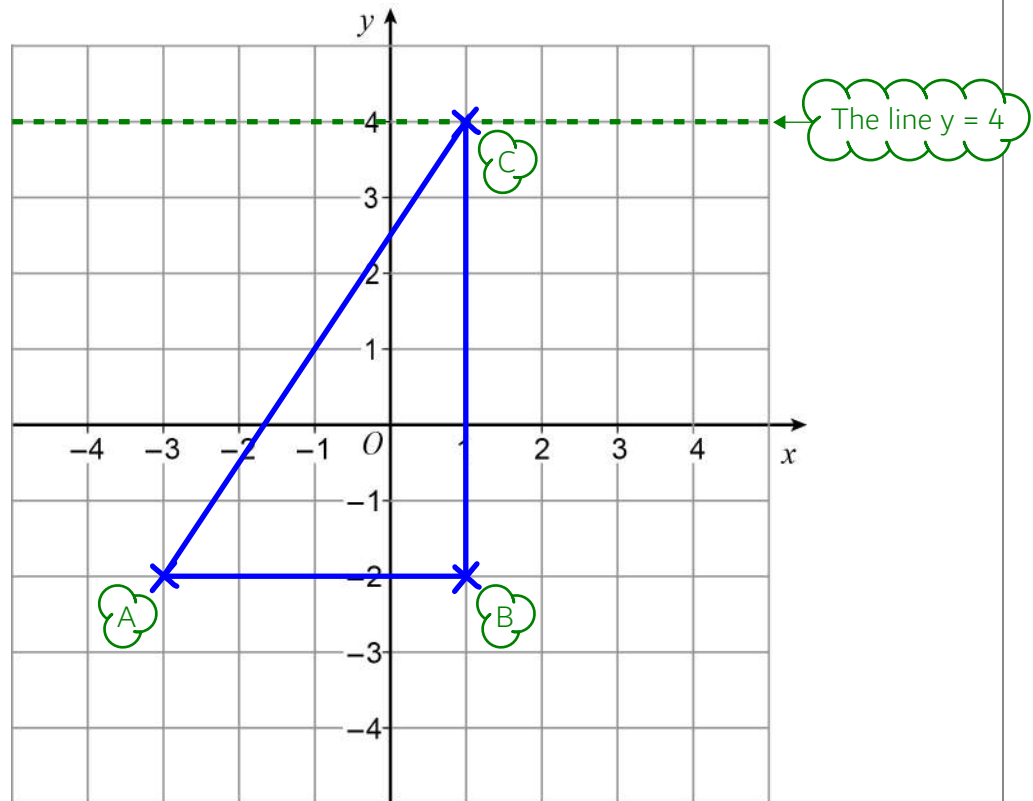
BCP and RCP have cheese and pickle.
This is 2 out of the 8 options



- 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]



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

[2 marks]

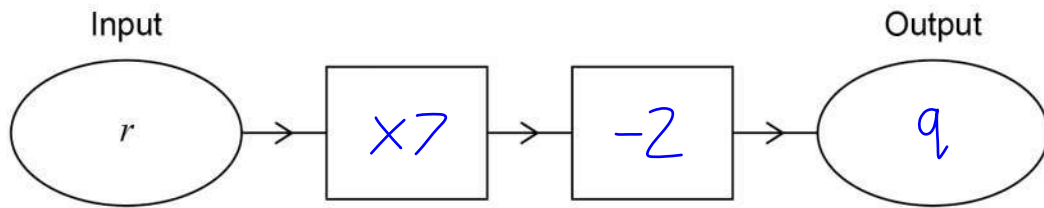
$$\frac{1}{2} \times 4 \times 6 \leftarrow \text{Area of triangle} = \frac{1}{2} \times \text{base} \times \text{height}$$

Answer 12 cm^2

Turn over ►



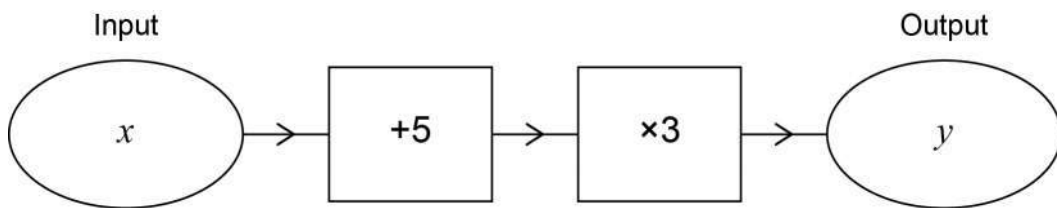
- 8 (a) Complete the number machine so that $q = 7r - 2$



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 .



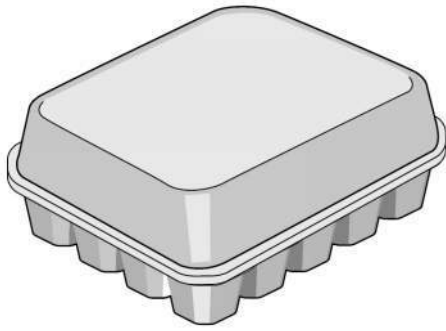
[1 mark]

Answer $3(x+5)$

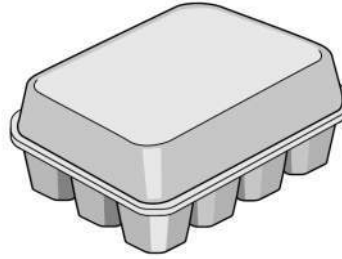
5 is added to x then the result is multiplied by 3



- 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]

$$54 - 10 - 15 - 25 = 4$$

Subtracting the numbers of boxes filled so far from the total of 54 boxes works out how many more boxes need to be filled

$$580 - 10 \times 20 - 15 \times 12 - 25 \times 6 = 50$$

Subtracting the number of eggs used so far from the total of 580 eggs works out how many more eggs are in the 4 extra boxes. Multiplying the number of boxes by the number of eggs in each box works out the number of eggs used

The only way of filling 50 eggs in 4 boxes is filling a box of 20, 2 boxes of 12 and a box of 6. These are in addition to the ones already filled

Answer 11 boxes of 20 eggs

17 boxes of 12 eggs

26 boxes of 6 eggs

Turn over ►



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]**

$$10 + 10 + 20 = 40$$

10 and 20 are multiples of 10. Adding together two 10s and a 20 gives 40, which is a multiple of 10 but is not a multiple of 3

Answer No 

11 A fair spinner has 12 equal sections.

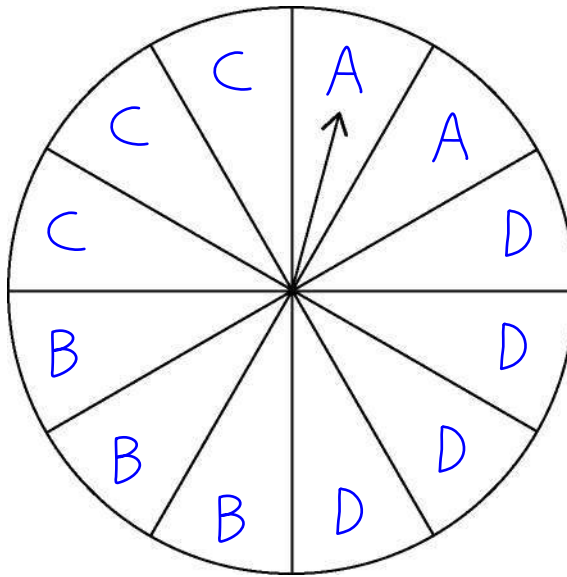
Label each section A, B, C or D so that when the arrow is spun,

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]



Turn over for the next question

There are 12 equal sections and $\frac{1}{6}$ of 12 is 2 so there must be 2 As. There must be twice as many Ds and $2 \times 2 = 4$ so there must be 4 Ds. There are 6 sections left over and there must be an equal number of B and C so there must be 3 of each of these



12 $a - b = 5$

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

[1 mark]

It is 2 lots of $(a - b)$ so the value must be 2×5

Answer 10

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

[1 mark]

7 can be brought out as a factor to give $7(a - b)$.
It is 7 lots of $(a - b)$ so the value must be 7×5

Answer 35

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

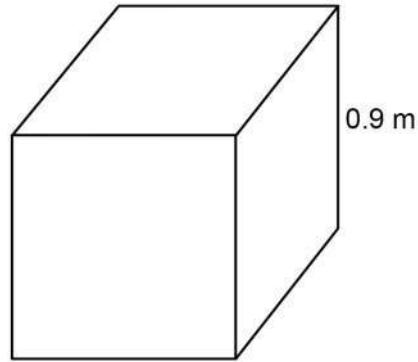
[1 mark]

a could be 7 and b could be 2. $2 - 7 = -5$

Answer -5



- 13 A cube has edge length 0.9 metres.



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

Give your answer in **square centimetres**.

[3 marks]

$$(0.9 \times 100)^2 \times 6$$

There are 100cm in 1m so multiplying the 0.9m by 100 converts it into centimetres. Area of square = length² so squaring the length in centimetres gives the area of one of the square faces. There are 6 identical square faces on a cube so area of one of the faces is multiplied by 6

Answer 48600 cm²

Turn over for the next question



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

Work out the total interest.

[3 marks]

$$1700 \times \frac{4 \times 3}{100}$$

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

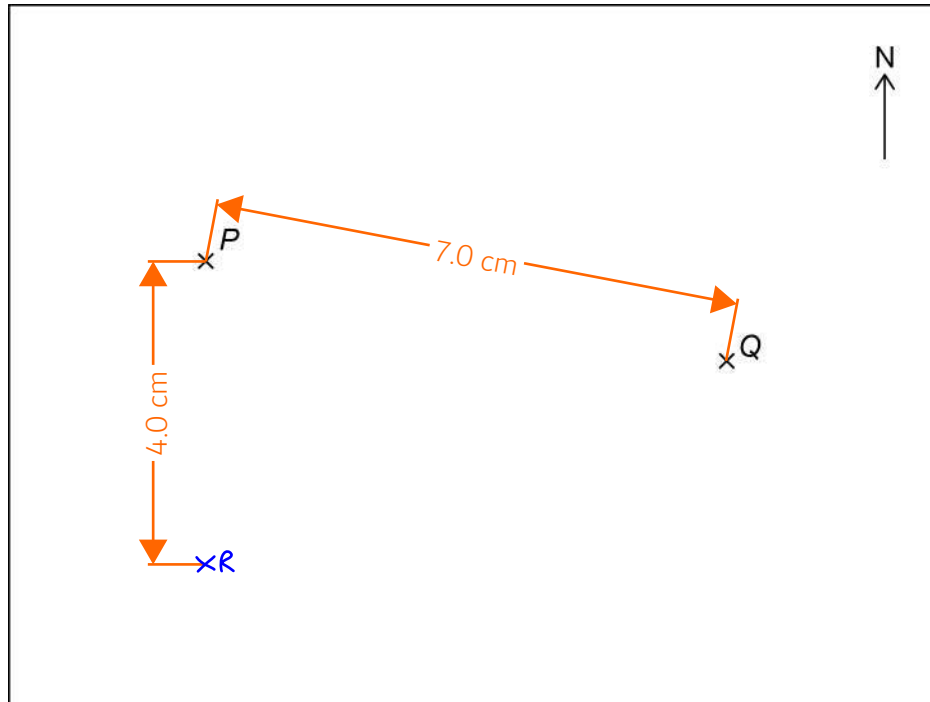
Answer £

204



- 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]

$$7 \times 50$$

P and Q are 7cm away from each other on the map. Every centimetre represents 50km so multiplying the 7cm by 50 works out the actual distance

Answer 350 km

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

Mark R on the map.

[2 marks]

$$\frac{200}{50} = 4$$

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

Turn over ►



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

The first-class carriage has 64 seats.

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

Each standard carriage has 78 seats.

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

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

You **must** show your working.

[5 marks]

$$\frac{3}{8} \times 64 + \frac{7}{13} \times 78 \times 6 - \frac{64 + 6 \times 78}{2} = 10$$

3/8 of the first-class carriage

Half of the total number of seats

7/13 of the 6 standard carriages

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. As the result is positive, there are more than half of the seats being used

Answer

Yes



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

[1 mark]

$$x - 3 = \frac{x}{2}$$

$$x = \frac{3+x}{2}$$

$$3x = 36$$

$$\frac{x}{6} = 0$$

Substituting x for 6 gives $6 - 3$ and $6/2$, which are both equal to 3. 6 satisfies the equation so is therefore a solution

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

Circle the inequality that shows this.

[1 mark]

$$5 \leq x < 9$$

$$5 > x \geq 9$$

$$5 \leq x > 9$$

$$5 < x \leq 9$$

Turn over for the next question

Turn over ►



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 A greater percentage were female

Average age The mean age of the females was greater

Spread of ages The age range of the females was greater



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]

$s^d t$ ← This is a speed, distance, time problem so writing the formula triangle

$1:30 + \frac{140}{50}$ ← From the formula triangle, time = distance/speed. 140/50 works out the time taken in hours. 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°

Answer 4:18 pm

FACT B Convert the answer of 4.3 hours into time by pressing the button on the left. This gives the answer as 4°18'0"

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

How does this affect the arrival time?

[1 mark]

It will be later

Time = distance/speed so having a lower speed will mean dividing by less, which increases the time

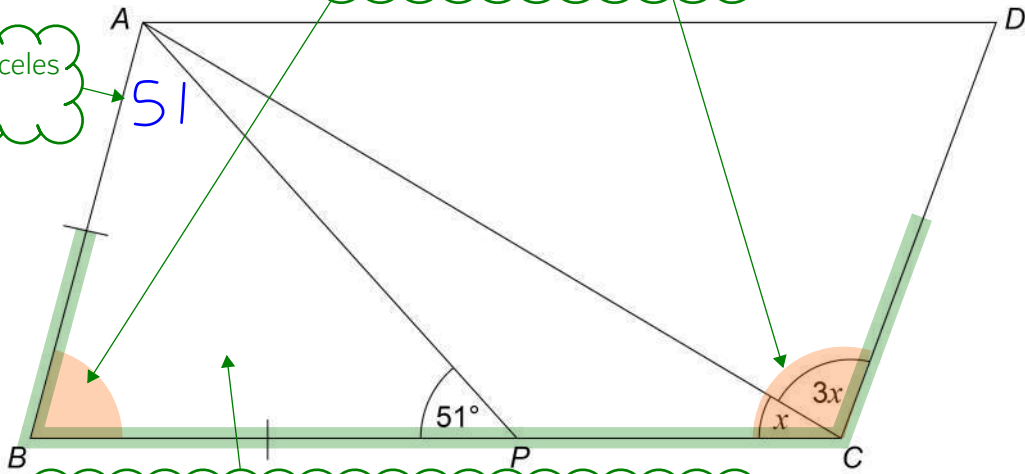


22

$ABCD$ is a parallelogram.

$AB = BP$

Not drawn accurately



Base angles of an isosceles triangle are equal

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

This triangle is isosceles as two of the sides are equal

Work out the size of angle x .

[4 marks]

$$180 - 51 \times 2 + x + 3x = 180$$

Co-interior angles add up to 180

Expressing angle ABP by subtracting the other two angles in the triangle. The angles in a triangle add up to 180

Expressing angle PCD , which is co-interior to ABP

$$x = \frac{180 - (180 - 51 \times 2)}{4}$$

Rearranged the equation to find x . Subtracting $(180 - 51 \times 2)$ from both sides. $x + 3x = 4x$ so dividing both sides by 4 makes x the subject

Answer 25.5 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. $268 - 3^5 = 25$, which is a square number

Answer $3^5 + 25$



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

Circle the correct equation.

[1 mark]

$$y = \frac{k}{x}$$

$$y = kx$$

$$y = \frac{x}{k}$$

$$y = x - k$$

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

25

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

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

Rearranging the formula gives that force = pressure x area. $24 \times 3 = 72$

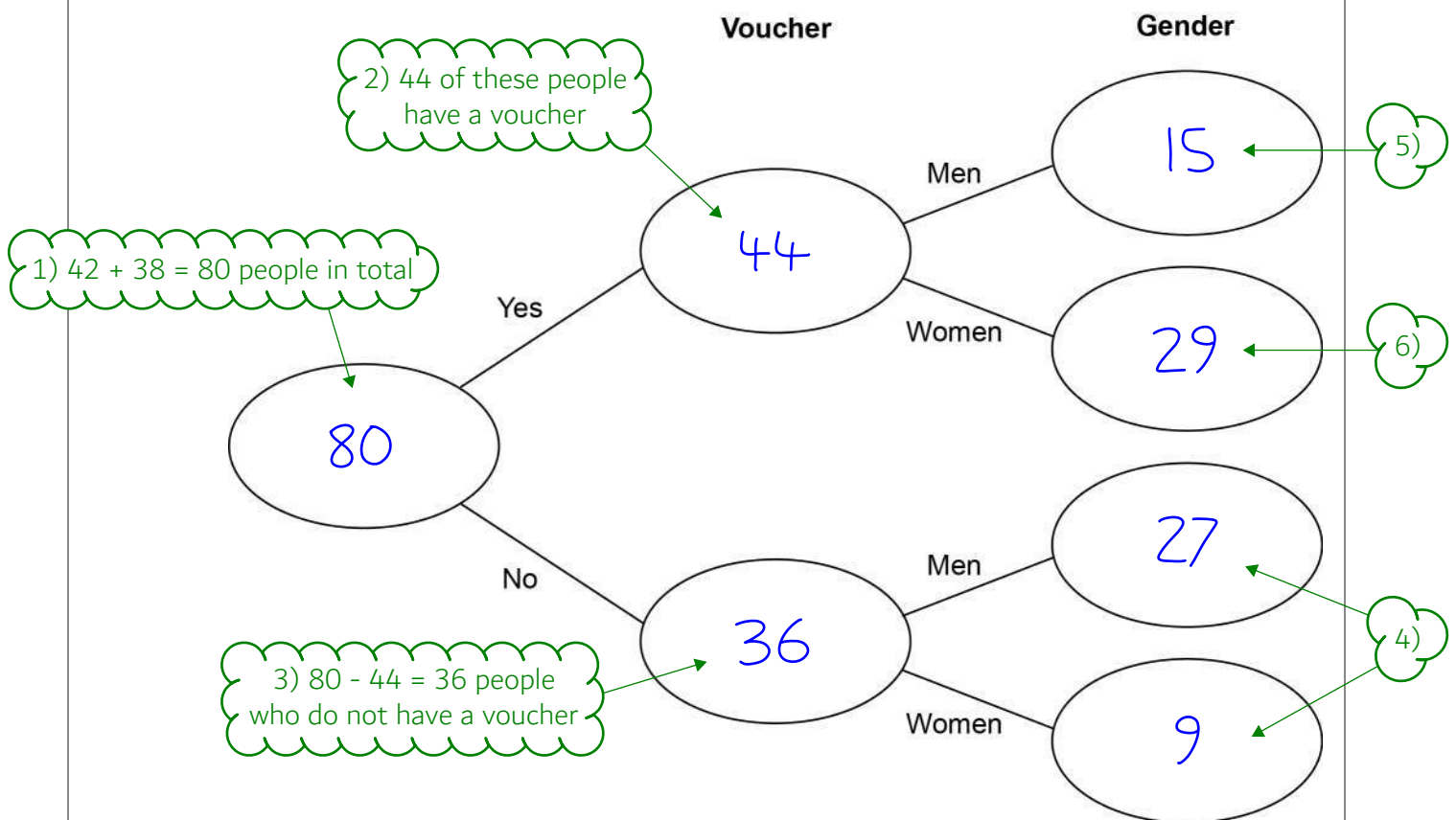
Turn over for the next question



- 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]



4) The ratio of men who do not have a voucher to women who do not have a voucher is 3 : 1. Dividing the 36 who do not have a voucher into this ratio. There are 4 parts in total so $36/4 = 9$, which is the value of 1 part of the ratio and is how many women do not have a voucher. 9×3 works out that the value of the 3 parts of the ratio is 27.

5) There are 42 men in total and 27 of these do not have a voucher. So $42 - 27$ works out that 15 men do have a voucher.

6) There are 38 women in total and 9 of these do not have a voucher. So $38 - 9$ works out that 29 women do 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]

$$\frac{27.20}{100-15} \times 100$$

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 £

32

Turn over for the next question**Turn over ►**

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

[2 marks]

$$v - u = at$$

Subtracting u from both sides gets the term involving t on its own

Answer

$$\frac{v-u}{a} = t$$

Dividing both sides by a gets t on its own

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

[2 marks]

Distance	Time	Speed	Acceleration
m	s	m/s	m/s ²

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



28

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

[2 marks]

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

$$x^2 - 8x - 8x + 64$$

Answer $x^2 - 16x + 64$

END OF QUESTIONS

