

Write your name here

Surname

Other names

Centre Number

Candidate Number

Pearson Edexcel
Level 1/Level 2 GCSE (9–1)

Mathematics

Paper 2 (Calculator)

Foundation Tier

Monday 6 November 2017 – Morning

Time: 1 hour 30 minutes

Paper Reference

1MA1/2F

You must have: Ruler graduated in centimetres and millimetres, protractor, pair of compasses, pen, HB pencil, eraser, calculator. Tracing paper may be used.

Total Marks

Instructions

- Use **black** ink or ball-point pen.
- **Fill in the boxes** at the top of this page with your name, centre number and candidate number.
- Answer **all** questions.
- Answer the questions in the spaces provided – *there may be more space than you need.*
- You must **show all your working**.
- Diagrams are **NOT** accurately drawn, unless otherwise indicated.
- **Calculators may be used.**
- If your calculator does not have a π button, take the value of π to be 3.142 unless the question instructs otherwise.



Information

- The total mark for this paper is 80
- The marks for **each** question are shown in brackets – *use this as a guide as to how much time to spend on each question.*

Advice

- Read each question carefully before you start to answer it.
- Keep an eye on the time.
- Try to answer every question.
- Check your answers if you have time at the end.

Turn over ►

P49360A

©2017 Pearson Education Ltd.

6/6/7/2/

.CG Maths.
Worked Solutions



Pearson

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

Any writing in blue should be written in the exam.

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

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

Answer ALL questions.

Write your answers in the spaces provided.

You must write down all the stages in your working.

- 1 Write $\frac{7}{100}$ as a decimal.

Typing it into the calculator and formatting as a decimal

0.07

(Total for Question 1 is 1 mark)

- 2 Write down a multiple of 6 that is between 40 and 50

$6 \times 7 = 42$ so 42 is a multiple of 6

42

(Total for Question 2 is 1 mark)

- 3 (a) Simplify $3f \times 5g$

Multiplication can be done in any order so $3 \times 5 = 15$ can be done first. Then 15 is multiplied by f and g

15fg

(1)

- (b) Simplify $t \times t$

t is multiplied by itself

t^2

(1)

- (c) Simplify $\frac{2n + 6n}{2}$

$2n + 6n = 8n$ then $8n/2 = 4n$

4n

(1)

(Total for Question 3 is 3 marks)

DO NOT WRITE IN THIS AREA

DO NOT WRITE IN THIS AREA

DO NOT WRITE IN THIS AREA

4 Ken buys some fruit.

He buys apples, bananas, peaches and oranges.

Ken buys

- 4 apples weighing 125 g each
- 2 bananas weighing 170 g each
- 3 peaches weighing 135 g each

Each orange has a weight of 90 g.

The fruit has a total weight of 1.785 kg.

(a) Work out how many oranges Ken buys.

$4 \times 125 = 500$

$2 \times 170 = 340$

$3 \times 135 = 405$

Multiplying the numbers of each fruit by the weight of each fruit works out that the apples weight 500 g, the bananas weight 340 g and the peaches weigh 405 g

1.785×1000

1 kg = 1000 g so multiplying the 1.785 kg by 1000 converts it to 1785 g

$1785 - 500 - 340 - 405$

Subtracting the weights of the apples, the bananas and the peaches from the total weight in grams works out that the oranges weigh 540 g

$540 \div 90$

Dividing the weight of the oranges by the weight of each orange works out that there are 6 oranges

6
.....
(3)

Jane wants to buy 15 tomatoes.

She asks for 1 kg of tomatoes at a shop.

Jane assumes that each tomato has a weight of 75 g.

(b) (i) If Jane's assumption is correct, will she get 15 tomatoes?

You must show how you get your answer.

$1000 \div 75 = 13.\dot{3}$

1 kg = 1000 g then dividing this by the 75 g works out how many tomatoes she should get

No

The number of tomatoes would be 13 to the nearest whole number. Even if it were rounded up to 14, this is still less than 15

(2)

(ii) If Jane's assumption is **not** correct, could she get 15 tomatoes?

Justify your answer.

Yes as the tomatoes could have any weight

The assumption was that each tomato weights 75 g. If this is not correct then the tomatoes could have any weight so it is possible that 15 of them would weigh 1 kg

(1)

(Total for Question 4 is 6 marks)

5 60 students were asked how they get to school.

The table shows the results.

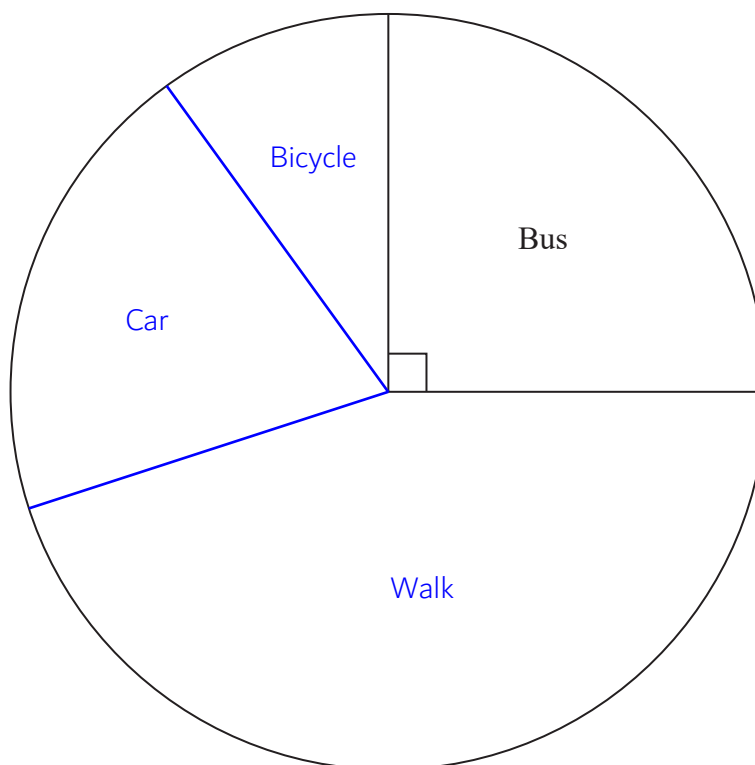
	Bus	Walk	Car	Bicycle
Number of students	15	27	12	6

(a) What fraction of the 60 students did **not** walk to school?

$15 + 12 + 6$ ← Adding the 15 for bus, the 12 for car and the 6 for bicycle works out that 33 students did not walk
 33 out of the 60 students did not walk → $\frac{33}{60}$
 (2)

(b) Complete the pie chart for the information in the table.

$360 \div 60$ ← There are 360° in total in a pie chart which represent the 60 students. So dividing 360° by 60 works out that 6° represents 1 student
 $27 \times 6 = 162$ ← Multiplying the 27 students for walk by the 6° for each student works out that the angle for walk should be 162° . Multiplying the 12 students for car by the 6° for each student works out that the angle for car should be 72°
 $12 \times 6 = 72$ ←



(4)

(Total for Question 5 is 6 marks)

Drawing the angles for walk and car using a protractor. The sector remaining is for bicycle. Labelling the sectors

6 Annie and Lily share some money in the ratio 4 : 3

(a) What fraction of the money does Lily get?

4 + 3 = 7 parts in total in the ratio. 3 out of these are for Lily

$\frac{3}{7}$

(1)

Rosie and Dan share some sweets.

Dan gets $\frac{1}{4}$ of the sweets.

(b) Write down the ratio of the number of sweets Rosie gets to the number of sweets Dan gets.

Dan gets 1 out of a total of 4 parts. If there are 4 parts in total, 4 - 1 = 3 parts for Rosie

3 : 1

(1)

(Total for Question 6 is 2 marks)

7 Steve says,

“There are more prime numbers between 20 and 30 than there are between 10 and 20”

Is Steve right?

You must show how you get your answer.

Prime numbers are only divisible by themselves and 1. They can be found by formatting each whole number as a product of prime factors using the calculator. If they stay the same they must be prime

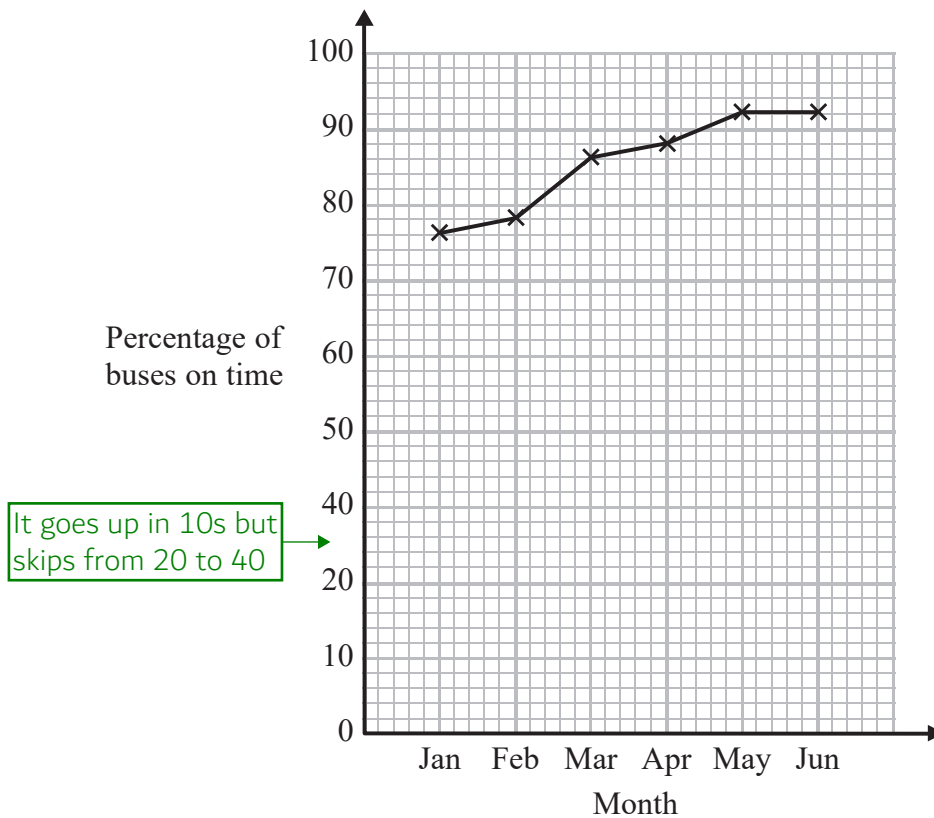
11, 13, 17, 19 ← Listing the prime numbers between 10 and 20

23, 29 ← Listing the prime numbers between 20 and 30

No ← There are 2 prime numbers between 10 and 20 and there are 4 prime numbers between 10 and 20

(Total for Question 7 is 2 marks)

- 8 Chrissy drew this graph to show the percentage of buses that got to a bus stop on time for six months.



- (a) Write down **one** thing that is wrong with the graph.

30 is missing from the vertical scale

(1)

- (b) Describe the trend in the percentage of buses that got to the bus stop on time.

Increasing

The line generally goes upward

(1)

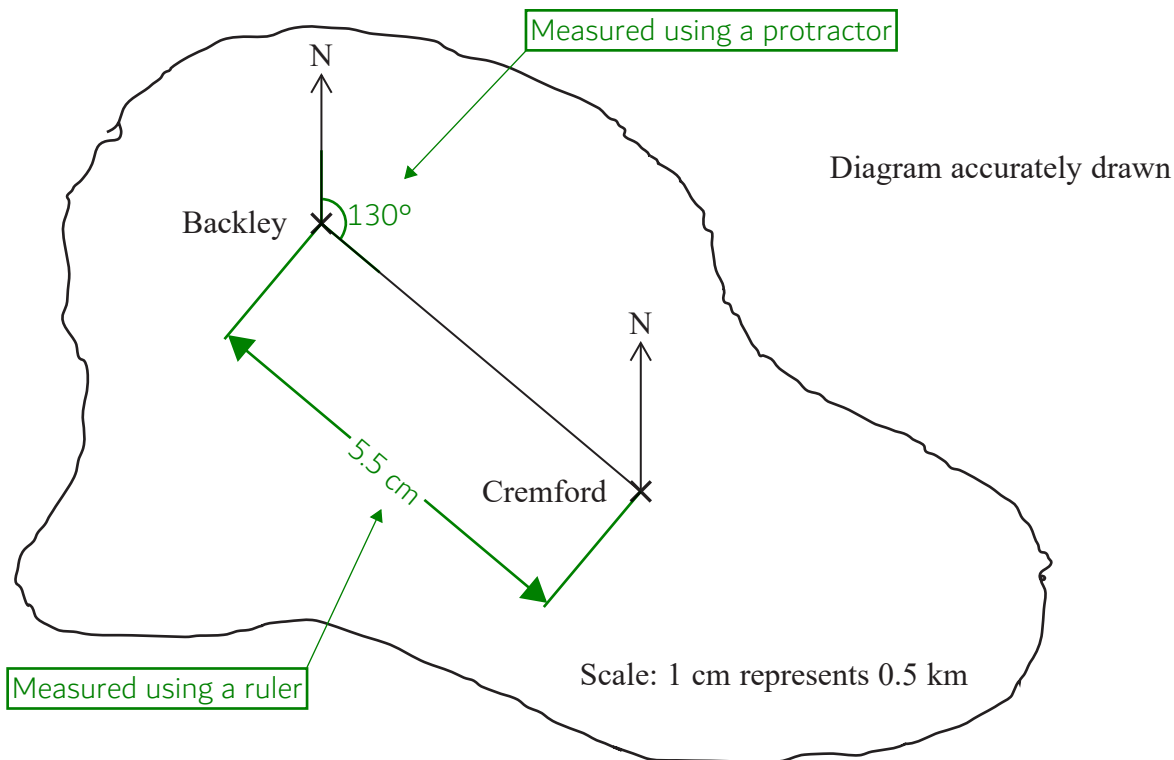
(Total for Question 8 is 2 marks)

DO NOT WRITE IN THIS AREA

DO NOT WRITE IN THIS AREA

DO NOT WRITE IN THIS AREA

9 Here is a map of an island.



A straight road joins the two villages, Backley and Cremford.

(a) Work out the real distance between the two villages.

5.5×0.5 ← 5.5 is 5.5 lots of 1 cm so it represents 5.5 lots of the 0.5 km

..... 2.75 km
(2)

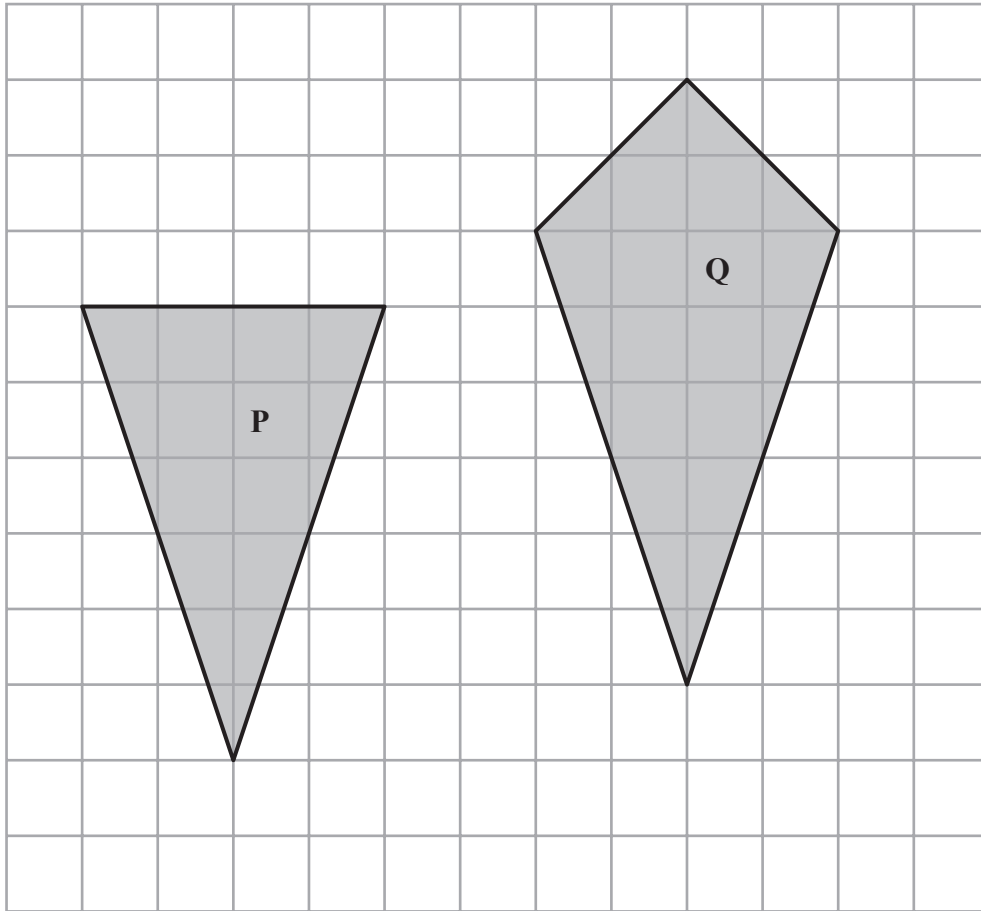
(b) Find the bearing of Cremford from Backley.

The bearing is the degrees turned clockwise from north from Backley to Cremford

..... 130 °
(1)

(Total for Question 9 is 3 marks)

10 The diagram shows two shapes drawn on a centimetre grid.



(a) Find the area of shape P.

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

$$\text{The unit is cm}^2 \text{ as it is measured in squares on a centimetre grid} \longrightarrow 12 \text{ cm}^2$$

(2)

(b) Write down the mathematical name of quadrilateral Q.

Four-sided shape with two pairs of equal sides which are next to each other

Kite

(1)

(Total for Question 10 is 3 marks)

DO NOT WRITE IN THIS AREA

DO NOT WRITE IN THIS AREA

DO NOT WRITE IN THIS AREA

11 The table shows a cricket club's income in 2016 from a fete, a quiz and membership fees.

	Income	
Fete	£250	
Quiz	Entry fees	13 at £5 each
	Refreshments	£35
Membership fees	25 at £20 each	

Express as a ratio

the income from the fete to the income from the quiz to the income from membership fees.

Give your ratio in its simplest form.

13×5 ← Multiplying the 13 entry fees by the £5 each works out that the income from the entry fees is £65

$65 + 35 = 100$ ← Adding the £35 income for the refreshments to the £65 income for the entry fees works out that the income from the quiz is £100

$25 \times 20 = 500$ ← Multiplying the 25 membership fees by the £20 each works out that the income from the membership fees is £500

$250 : 100 : 500$ ← Expressing the ratio

$25 : 10 : 50$ ← Simplifying the ratio by dividing all sides by 10

Simplifying the ratio by dividing all sides by 5. It cannot go simpler as 5, 2 and 10 cannot be divided by the same amount to get smaller whole numbers

..... $5 : 2 : 10$

(Total for Question 11 is 3 marks)

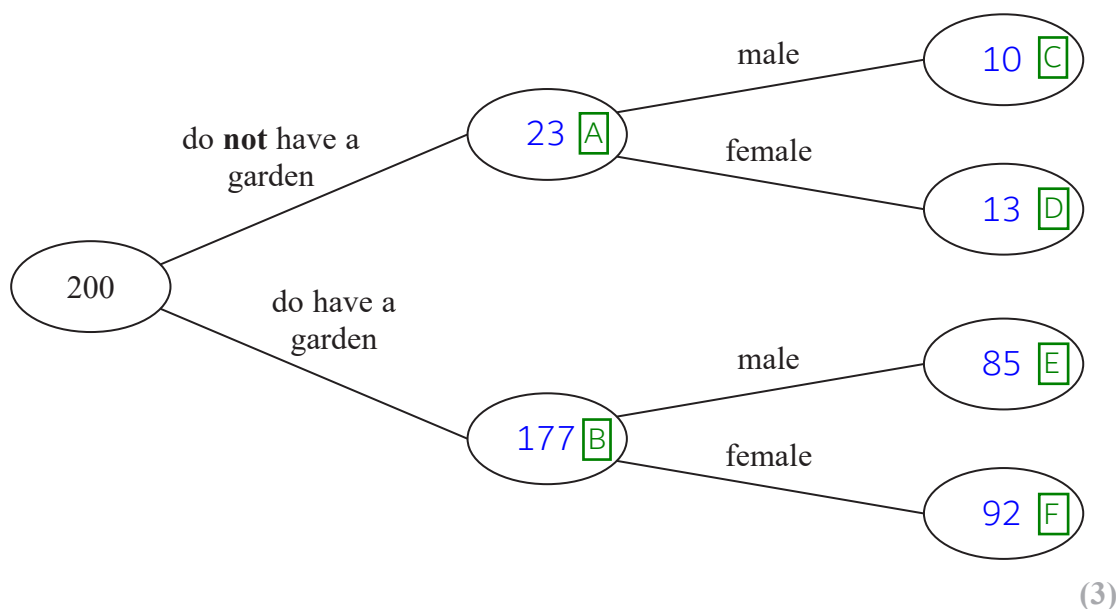
12 200 people live in a village.

23 people do **not** have a garden.

10 males do **not** have a garden.

95 people are male.

(a) Use this information to complete the frequency tree.



One of the people who does **not** have a garden is chosen at random.

(b) Write down the probability that this person is female.

13 out of the 23 who do not have a garden are female

$$\frac{13}{23}$$

(2)

(Total for Question 12 is 5 marks)

A: 23 people do not have a garden.

B: The rest of the 200 have a garden. $200 - 23 = 177$.

C: 10 males do not have a garden.

D: the rest of the 23 who have a garden must be female. $23 - 10 = 13$.

E: 95 people are male. 10 don't have a garden so the rest must have one. $95 - 10 = 85$.

F: The rest of the 177 who have a garden must be female. $177 - 85 = 92$

DO NOT WRITE IN THIS AREA

DO NOT WRITE IN THIS AREA

DO NOT WRITE IN THIS AREA

13 Ellie makes hats.
She makes at least 17 hats per hour.
She is paid 46p for each hat she makes.

Reaze is a waiter.
He works 35 hours and is paid a total of £266

Show that Ellie's hourly rate of pay is more than Reaze's hourly rate of pay.

$17 \times 0.46 = 7.82$ ← Multiplying the 17 hats by the £0.46 for each hat works out that Ellie's hourly rate of pay is at least £7.82 per hour

$266 \div 35 = 7.60$ ← Dividing the £266 by the 35 hours works out that Reaze's hourly rate of pay is £7.60 per hour

£7.82 per hour is more than £7.60 per hour

(Total for Question 13 is 3 marks)

14 a and b are odd numbers.

(a) Give an example to show that the value of $2(a + b)$ is a multiple of 4

$2(1 + 1) = 4$ ← a could be 1 and b could be 1. Substituting these into $2(a + b)$ gives 4, which is a multiple of 4

(2)

(b) Show that, when a and b are both odd numbers, the value of $2(a + b)$ will always be a multiple of 4

odd + odd = even ← So $a + b$ must be even

Doubling an even gives a multiple of 4

(2)

(Total for Question 14 is 4 marks)

DO NOT WRITE IN THIS AREA

DO NOT WRITE IN THIS AREA

DO NOT WRITE IN THIS AREA

DO NOT WRITE IN THIS AREA

DO NOT WRITE IN THIS AREA

DO NOT WRITE IN THIS AREA

15 Mr Page uses oil to heat his home.

At the beginning of November there were 1000 litres of oil in his oil tank.

Mr Page bought enough oil to fill the tank completely.

He paid 50p per litre for this oil.

He paid a total amount of £750

At the end of February Mr Page had 600 litres of oil in the tank.

He bought enough oil to fill the tank completely.

The cost of oil had increased by 4%.

Work out the total amount Mr Page paid for the oil he bought in February.

$750 \div 0.50$

50p is £0.50. Dividing the £750 spent in November by the £0.50 per litre works out that 1500 litres were bought in November

$1000 + 1500$

Adding the 1500 litres bought to the 1000 litres already in the tank works out that it takes 2500 litres to completely fill the tank

$2500 - 600 = 1900$

Subtracting the 600 litres in the tank at the end of February from the 2500 litres to completely fill the tank works out that 1900 litres were bought in February

$\frac{4}{100} \times 0.50$

Putting 4% over 100 convert it to a fraction, which finds that 4% of £0.50 is £0.02 when multiplied

$0.50 + 0.02$

Adding the value of 4% to the £0.50 works out that the cost of oil had increased to £0.52 in February

1900×0.52

Multiplying the 1900 litres bought in February by the £0.52 per litre works out that £988 was paid in February

£.....988.....

(Total for Question 15 is 5 marks)

16 Solve $5x - 6 = 3(x - 1)$

$5x - 6 = 3x - 3$ ← Expanding the bracket on the right

$2x - 6 = -3$ ← Subtracting $3x$ from both sides to get all the x on the same side

$2x = 3$ ← Adding 6 to both sides eliminates the -6 on the left and gets the x term on its own

Dividing both sides by 2 gets x on its own

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

(Total for Question 16 is 3 marks)

17 Emily buys a pack of 12 bottles of water.

The pack costs £5.64

Emily sells all 12 bottles for 50p each.

Work out Emily's percentage profit.

Give your answer correct to 1 decimal place.

12×0.50 ← 50p is £0.50. Multiplying the 12 bottles by the £0.50 each works out that the income from selling the bottles is £6

$6 - 5.64$ ← Subtracting the £5.64 costs from the £6 income works out that the profit is £0.36

$\frac{0.36}{5.64} \times 100$ ← Putting the £0.36 profit over the original £5.64 expresses the profit as a fraction. Multiplying this by 100 converts it to a percentage

6.38... is rounded to 1 decimal place

..... 6.4 %

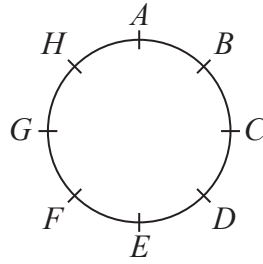
(Total for Question 17 is 3 marks)

DO NOT WRITE IN THIS AREA

DO NOT WRITE IN THIS AREA

DO NOT WRITE IN THIS AREA

18 Hasmeet walks once round a circle with diameter 80 metres.



There are 8 points equally spaced on the circumference of the circle.

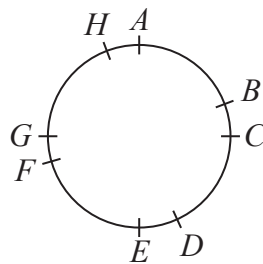
(a) Find the distance Hasmeet walks between one point and the next point.

$\pi \times 80$ ← The total distance is the circumference of the circle. Circumference = $\pi \times$ diameter

$80\pi \div 8$ ← Dividing the total distance by the 8 equal spaces finds that distance between one point and the next point

..... 10π m
(2)

Four of the points are moved, as shown in the diagram below.



Hasmeet walks once round the circle again.

(b) Has the mean distance that Hasmeet walks between one point and the next point changed? You must give a reason for your answer.

No as the total distance is still 80π and will still be divided by 8

Mean = total \div number, where total is the total distance and the number is the number of spaces

(1)

(Total for Question 18 is 3 marks)

19 There are only blue cubes, yellow cubes and green cubes in a bag.

There are

twice as many blue cubes as yellow cubes
and four times as many green cubes as blue cubes.

Hannah takes at random a cube from the bag.

Work out the probability that Hannah takes a yellow cube.

2 : 1 : 8

This is the ratio of blue : yellow : green. Let there be 1 part for yellow. There are twice as many blue so there are 2 parts for blue. There are four times as many green so there are 8 parts for green

$2 + 1 + 8 = 11$ parts in total. Out of these, there is 1 part for yellow

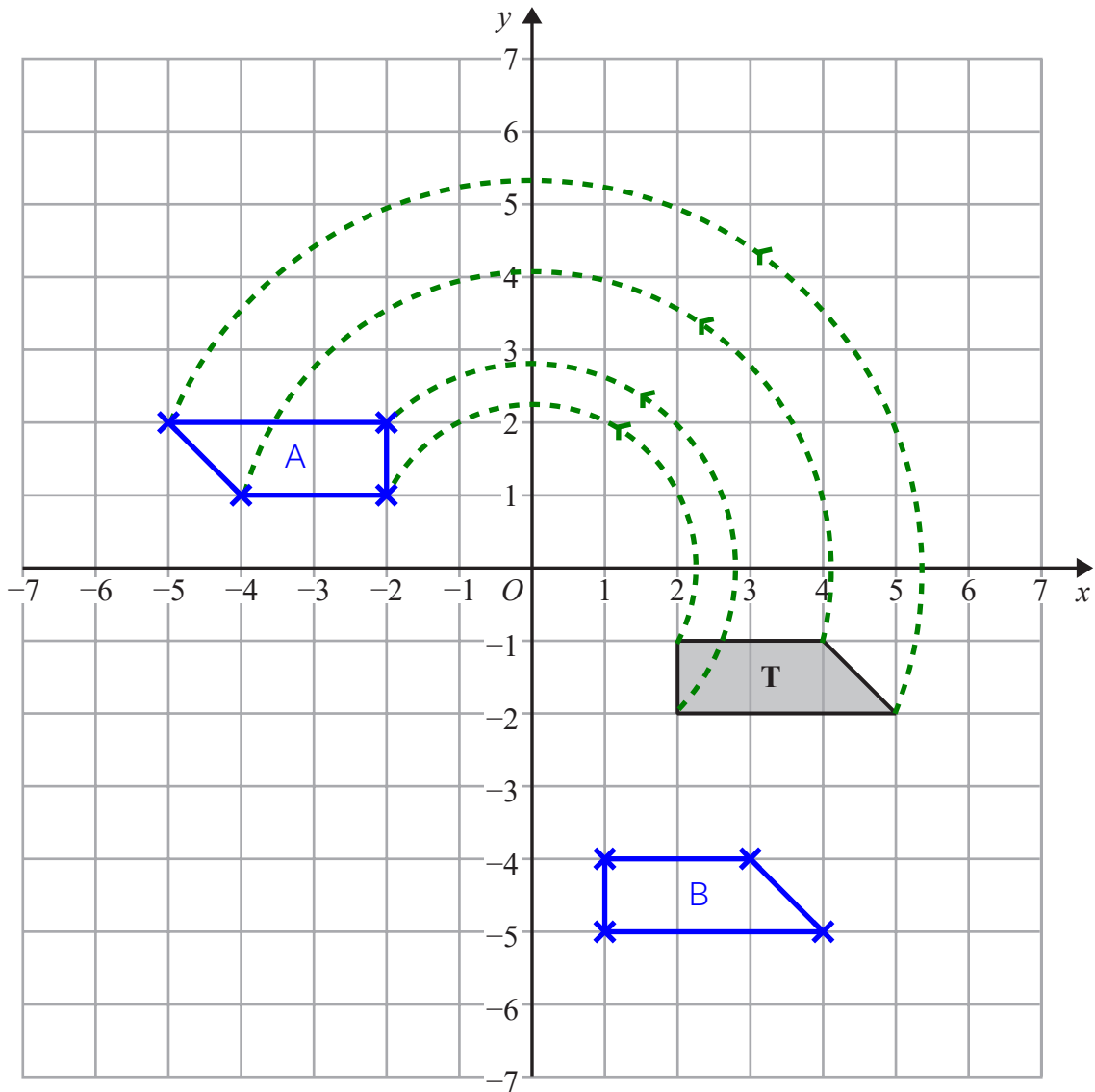
$\frac{1}{11}$

(Total for Question 19 is 3 marks)

DO NOT WRITE IN THIS AREA

DO NOT WRITE IN THIS AREA

DO NOT WRITE IN THIS AREA



- (a) Rotate trapezium **T** 180° about the origin.
Label the new trapezium **A**.

Use tracing paper to sketch around **T**, put something sharp in at the origin (0, 0), then rotate the paper 180°

(1)

- (b) Translate trapezium **T** by the vector $\begin{pmatrix} -1 \\ -3 \end{pmatrix}$
Label the new trapezium **B**.

-1 in the x-direction (1 left) and
-3 in the y-direction (3 down)

(1)

(Total for Question 20 is 2 marks)

21 $p^3 \times p^x = p^9$

(a) Find the value of x .

$$a^x \times a^y = a^{x+y} \text{ so } 3 + x = 9$$

$$x = \frac{6}{(1)}$$

$$(7^2)^y = 7^{10}$$

(b) Find the value of y .

$$(a^x)^y = a^{xy} \text{ so } 2 \times y = 10$$

$$y = \frac{5}{(1)}$$

$100^a \times 1000^b$ can be written in the form 10^w ← The form is a power of ten

(c) Show that $w = 2a + 3b$

$$(10^2)^a \times (10^3)^b \leftarrow \text{Expressing 100 and 1000 as powers of ten}$$

$$10^{2a} \times 10^{3b} \leftarrow (a^x)^y = a^{xy}$$

$$10^{2a+3b} = 10^w \leftarrow a^x \times a^y = a^{x+y}$$

$$w = 2a + 3b \leftarrow \text{The indices on both sides must be equal}$$

(2)

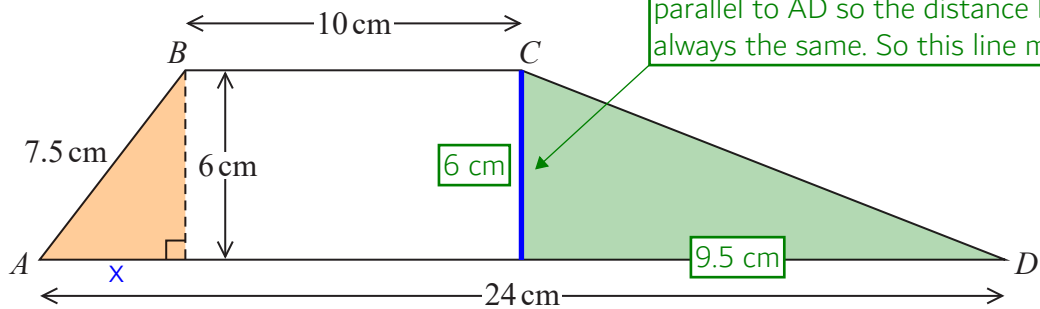
(Total for Question 21 is 4 marks)

DO NOT WRITE IN THIS AREA

DO NOT WRITE IN THIS AREA

DO NOT WRITE IN THIS AREA

22 $ABCD$ is a trapezium.



Drawing a line here forms a right-angled triangle involving angle CDA . As it is a trapezium, BC is parallel to AD so the distance between them is always the same. So this line must be also 6 cm

Work out the size of angle CDA .
Give your answer correct to 1 decimal place.

$x^2 + 6^2 = 7.5^2$ ← Using Pythagoras' Theorem in the orange right-angled triangle. $a^2 + b^2 = c^2$, where a and b are the shorter sides and c is the longest side

$x^2 = 20.25$ ← Subtracting 6^2 from both sides eliminates the $+6^2$ on the left and gets x^2 on its own

$x = 4.5$ ← Square rooting both sides eliminates the 2 on the left and gets x on its own

$24 - 4.5 - 10 = 9.5$ ← Subtracting the value of x and the 10 cm from the 24 cm finds that the base length of the green right-angled triangle is 9.5 cm

$\begin{matrix} \acute{O} & \acute{A} & \acute{O} \\ S & H & C & H & T & A \end{matrix}$ ← Using right-angled trigonometry in the green right-angled triangle. Ticking O as the 6 cm is the opposite and ticking A as the 9.5 cm is the adjacent. There are two ticks on the TOA formula triangle so this one can be used

$\tan CDA = \frac{6}{9.5}$ ← Covering T in the TOA formula triangle finds that \tan of the angle = opposite/adjacent

Doing the inverse tan of both sides finds the angle. 32.27... is rounded to 1 decimal place

32.3

(Total for Question 22 is 5 marks)

23 Use your calculator to work out $\sqrt{\frac{\sin 25^\circ + \sin 40^\circ}{\cos 25^\circ - \cos 40^\circ}}$

(a) Write down all the figures on your calculator display.

Type it all into the calculator exactly as it is above

2.75603957

(2)

(b) Write your answer to part (a) correct to 2 decimal places.

The 6 in the 3rd decimal place causes the 5 in the 2nd decimal place to round up. Then everything after the 2nd decimal place is set to 0 and is ignored

2.76

(1)

(Total for Question 23 is 3 marks)

DO NOT WRITE IN THIS AREA

DO NOT WRITE IN THIS AREA

DO NOT WRITE IN THIS AREA

DO NOT WRITE IN THIS AREA

DO NOT WRITE IN THIS AREA

DO NOT WRITE IN THIS AREA

24 (a) Solve $2x^2 = 72$

$x^2 = 36$ ← Dividing both sides by 2 eliminates the 2 on the left and gets x^2 on its own

Doing the positive and negative square root of the right eliminates the 2 as a power on the left

$x = \pm 6$

(2)

(b) Expand and simplify $(2x + 1)(3x - 2)$

$6x^2 - 4x + 3x - 2$ ← Expanding the brackets

Simplifying by collecting like terms

$6x^2 - x - 2$

(2)

(c) Factorise $x^2 + 6x + 9$

Two numbers which add to the 6 and multiply to the 9 are 3 and 3. Putting these in brackets with x gives $(x + 3)(x + 3)$, which is the same as $(x + 3)^2$

$(x + 3)^2$

(1)

(Total for Question 24 is 5 marks)

TOTAL FOR PAPER IS 80 MARKS