

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 ►

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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 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.

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.

Type into calculator and press the SD button

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^2

(1)

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

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

4n

(1)

(Total for Question 3 is 3 marks)

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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.

$$\frac{1785 - 4 \times 125 - 2 \times 170 - 3 \times 135}{90}$$

The total weight is converted into grams as the other weights are given in grams. To do this, 1.785 is multiplied by 1000 as there are 1000g in 1kg. Subtracting the weight of 4 apples, 2 bananas and 3 peaches leaves the weight of the oranges. Dividing all of this by 90 works out how many lots of 90g the weight of the oranges is

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.

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

Converted 1kg into grams so the units are the same.
Then working out how many lots of 75g go into it

No

13 is less than 15. Even if the number is rounded to 14 so there is more than 1kg, this is still less than 15

(2)

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

Yes, they could weigh less than 75g

(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?

60 - 27 = 33 so 33 out of the 60 students did not walk

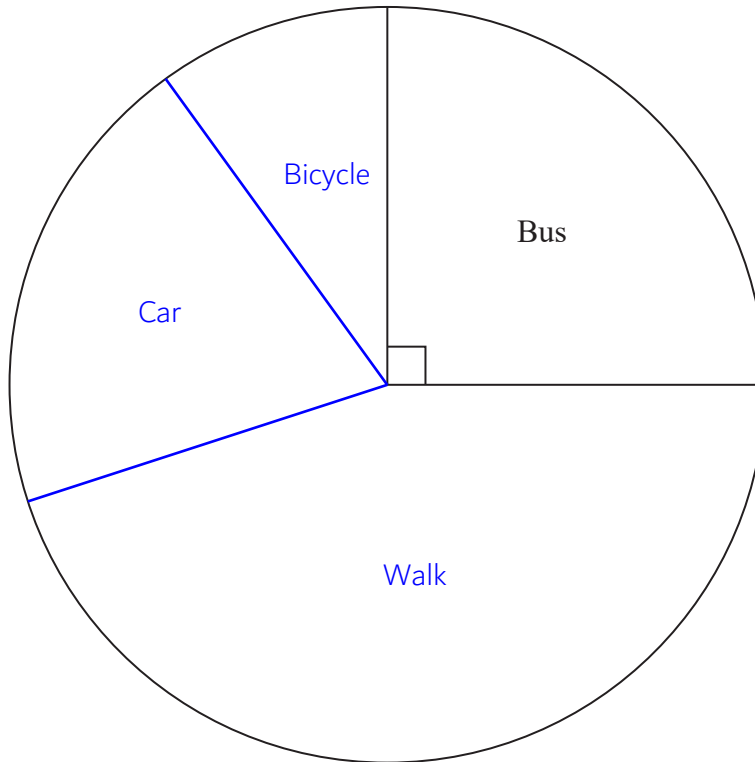
$$\frac{33}{60}$$

(2)

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

$$\begin{aligned} 360 \div 60 &= 6 \\ 27 \times 6 &= 162 \\ 12 \times 6 &= 72 \\ 6 \times 6 &= 36 \end{aligned}$$

There are 360 degrees in total in a pie chart. Dividing this by the total frequency works out how many degrees represent one person. Then multiplying each of the categories by 6 to work out the angle for each



(4)

(Total for Question 5 is 6 marks)

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

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

There are 7 parts in total. 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.

11, 13, 17, 19

These are the prime numbers between 10 and 20

23, 29

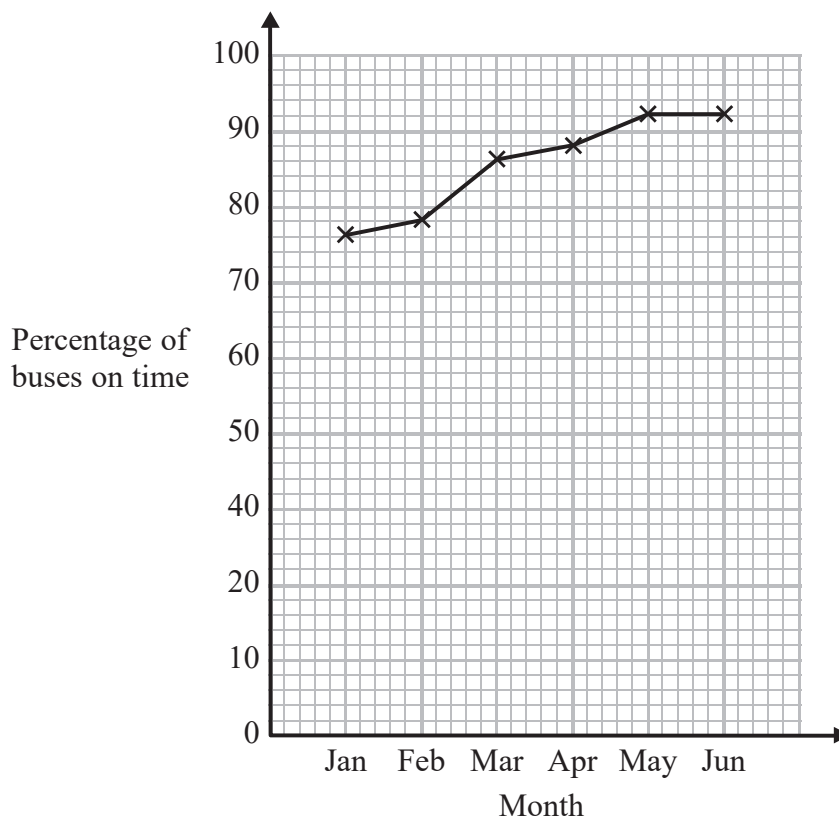
These are the prime numbers between 20 and 30

No

There are not more prime numbers between 20 and 30 than there are 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 y axis

(1)

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

Increasing

(1)

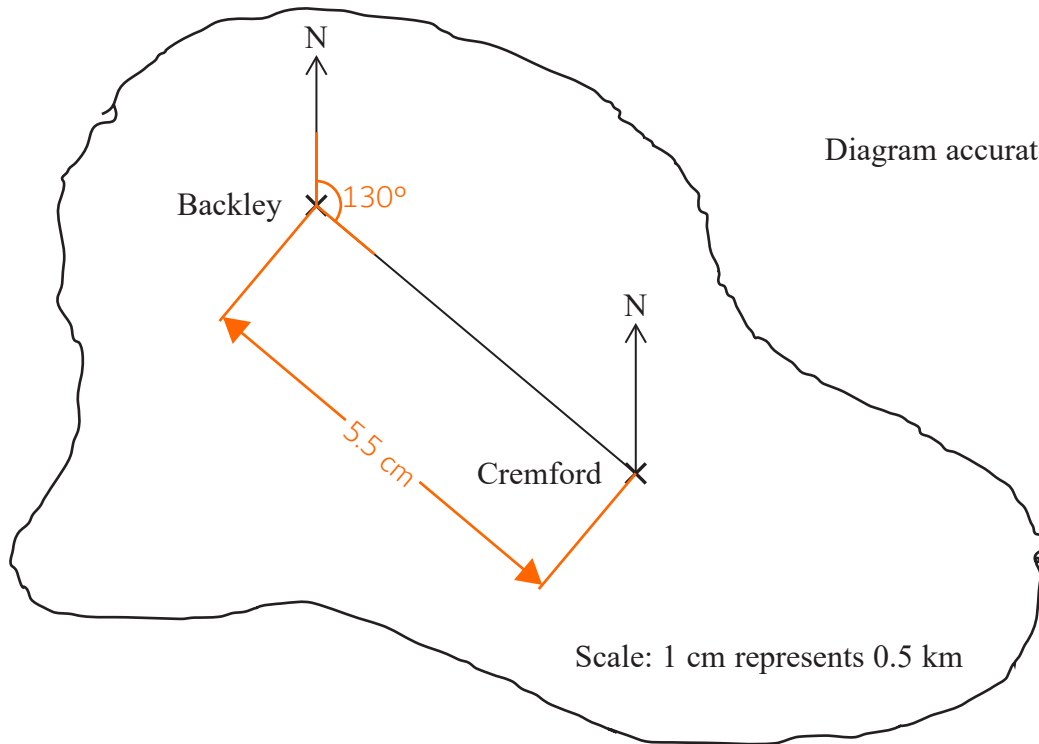
(Total for Question 8 is 2 marks)

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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.

$$5.5 \times 0.5$$

$$\underline{\quad 2.75 \quad} \text{ km}$$

(2)

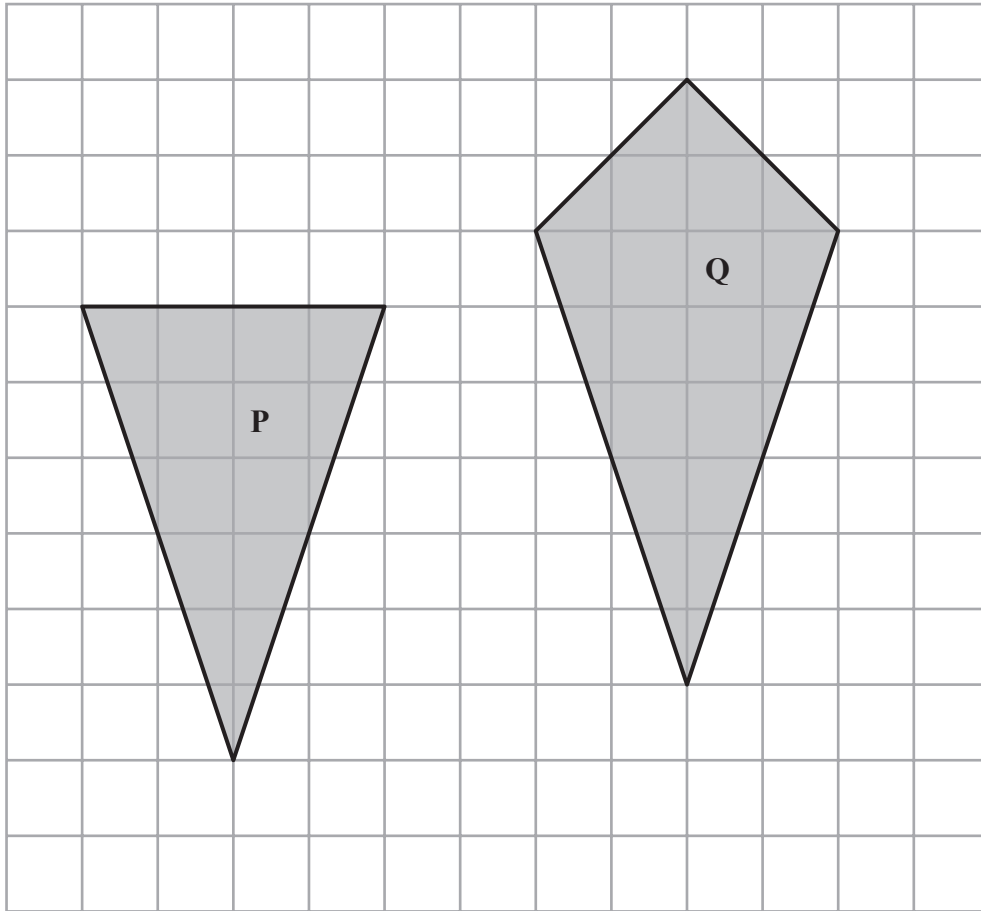
(b) Find the bearing of Cremford from Backley.

$$\underline{\quad 130 \quad} ^\circ$$

(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.

$$\frac{1}{2} \times 4 \times 6$$

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

$$12\text{cm}^2$$

(2)

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

Kite

(1)

(Total for Question 10 is 3 marks)

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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.

$13 \times 5 + 35 = 100$

Working out the income from the quiz

$25 \times 20 = 500$

Working out the income from the membership fees

$250 : 100 : 500$

Expressing the ratio

Simplifying the ratio by dividing all sides by 50

$5 : 2 : 10$

(Total for Question 11 is 3 marks)

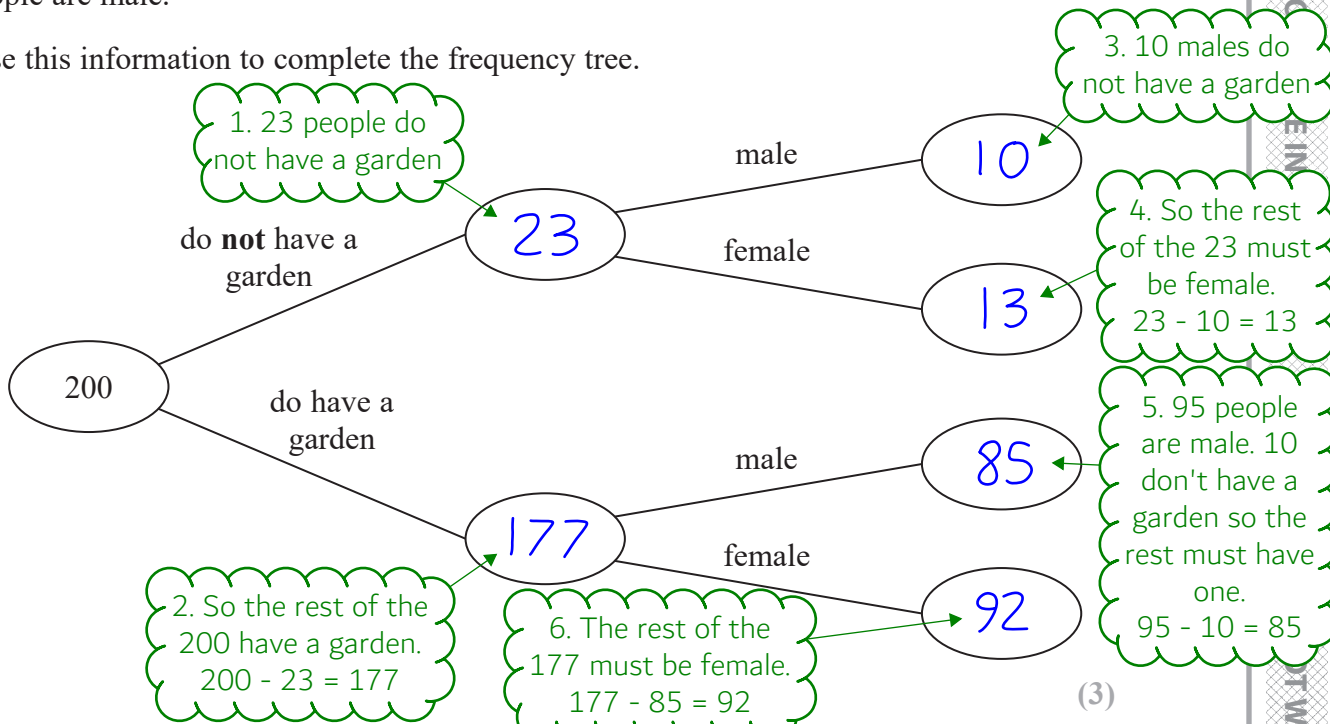
12 200 people live in a village.

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)

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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.

$17 \times \cancel{0.46} = \cancel{7.82}$ ← The minimum amount Ellie earns each hour

$\cancel{266} \div 35 = \cancel{7.60}$ ← The amount Reaze earns each 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

$$2(1+1) = 4$$

$1 \times 4 = 4$ so 4 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

$$2 \times 2n = 4n$$

$2n$ is an even number. $4n$ is a multiple of 4

(2)

(Total for Question 14 is 4 marks)

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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.

$$750 \div 0.50 = 1500$$

Every £0.50 paid is 1 litre of fuel. £750 is 1500 lots of £0.50 so 1500 litres were bought in November

$$1000 + 1500 = 2500$$

2500 litres is what the tank holds when it is full

$$2500 - 600 = 1900$$

Working out the difference between the full tank and how much he currently had in February. He bought 1900 litres

$$1900 \times 0.50 \times 1.04$$

Multiplying £0.50 by 1.04 increases it by 4% to give the new price per litre. Then multiplying it by 1900 to work out how much 1900 litres costs

£ 988

(Total for Question 15 is 5 marks)

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

$$5x - 6 = 3x - 3$$

Expand the brackets

$$2x = 3$$

Subtract $3x$ from both sides to bring all the x terms to one side. Then add 6 to both sides to get the x terms on their own

Divide both sides by 2 to get 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.

$$\frac{12 \times 0.50 - 5.64}{5.64} \times 100$$

Percentage profit = percentage change
= (new - original)/original \times 100. The new amount is what she sells them for, which is $12 \times \text{£}0.50$

6.382978723... is rounded to 1 decimal place

$$6.4\%$$

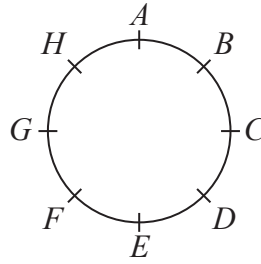
(Total for Question 17 is 3 marks)

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



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

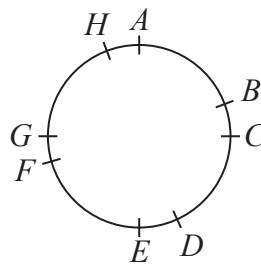
(a) Find the distance Hasmeet walks between one point and the next point.

$$\frac{80\pi}{8}$$

Circumference = $\pi \times$ diameter. Dividing this by 8 as there are 8 equally spaced points

..... 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/number where total is the total distance and the number is the number of points

(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.

1:2:8

This is the ratio of yellow : blue : 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

There are 11 parts in total. Out of these, there is 1 part for yellow

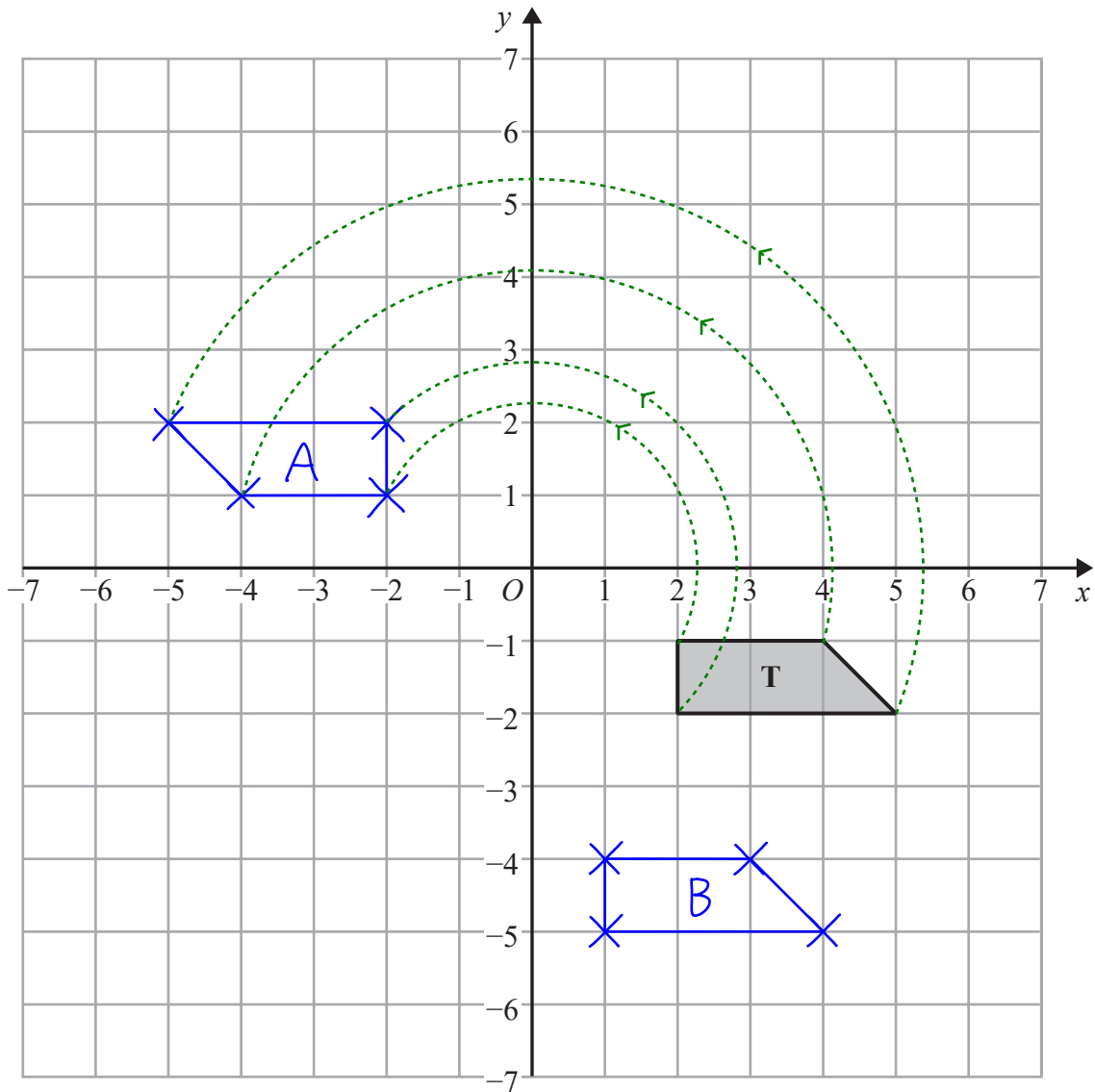
$\frac{1}{11}$

(Total for Question 19 is 3 marks)

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

Use tracing paper to sketch around **T** then rotate the paper 180° about the origin $(0, 0)$

(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 .

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

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

$10^a \times 1000^b$ can be written in the form 10^w

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

$$10^w = (10^2)^a \times (10^3)^b \leftarrow 100 = 10^2 \text{ and } 1000 = 10^3$$

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

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

$$w = 2a + 3b \leftarrow$$

This must be as the powers on the left must be the same as the powers on the right as they are both powers of 10

(2)

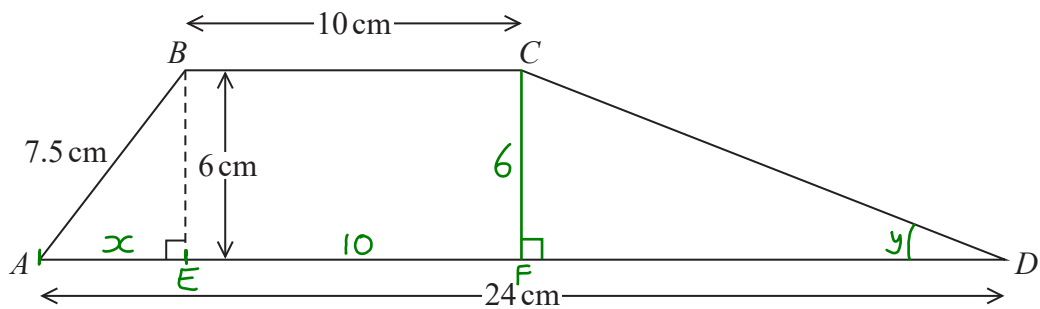
(Total for Question 21 is 4 marks)

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22 $ABCD$ is a trapezium.



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

$$a^2 + b^2 = c^2$$

Pythagoras' Theorem can be used to find x as we have two sides of the right-angled triangle ABE

$$x = \sqrt{7.5^2 - 6^2} = 4.5$$

Rearranged to make a the subject and substituted in the values. c is the longest side and is opposite the right angle so is 7.5

$$24 - 10 - 4.5 = 9.5$$

Finding side FD

SỐ CÁCH TỐÁ $\frac{O}{TIA}$

We have the opposite and adjacent in triangle CFD so these have been ticked. Two ticks means we can use the TOA formula triangle

$$\tan^{-1}\left(\frac{6}{9.5}\right)$$

(tan of the angle) = opposite/adjacent. Rearranging to get the angle on its own gives angle = $\tan^{-1}(\text{opposite/adjacent})$

32.27564431 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 into the calculator

2.75603957

(2)

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

2.76

(1)

(Total for Question 23 is 3 marks)

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

$x^2 = 36$ ← Divided both sides by 2

$x = \sqrt{36}$ ← Square rooted both sides

$x = \pm 6$
.....
(2)

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

$6x^2 - 4x + 3x - 2$

$6x^2 - x - 2$
.....
(2)

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

3 and 3 multiply to 9 and add to 6

$(x+3)(x+3)$
.....
(1)

(Total for Question 24 is 5 marks)

TOTAL FOR PAPER IS 80 MARKS