

Please write clearly in block capitals.

Centre number

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Candidate number

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Surname StemUp Model Solution

Forename(s) _____

Candidate signature _____

I declare this is my own work.

GCSE MATHEMATICS

Foundation Tier Paper 2 Calculator

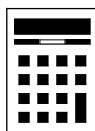
F

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.
- Fill in the boxes at the top of this page.
- 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.
- If you need extra space for your answer(s), use the lined pages at the end of this book. Write the question number against your answer(s).
- 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.



J U N 2 1 8 3 0 0 2 F 0 1

Answer **all** questions in the spaces provided.

Do not write
outside the
box

1 Circle the factor of 32

[1 mark]

16

12

3

64

2 y is 3 more than x .

Circle the correct equation.

[1 mark]

$$y = 3x$$

$$y = x + 3$$

$$y = x - 3$$

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

3 Circle the value of 0.15 as a fraction.

[1 mark]

$$\frac{1}{5}$$

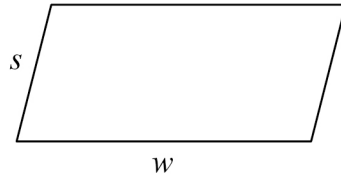
$$\frac{1}{6}$$

$$\frac{3}{20}$$

$$\frac{3}{50}$$



- 4 Here is a parallelogram.



Circle the expression for the **perimeter**.

[1 mark]

$$2s + 2w$$

$$s + w$$

$$sw$$

$$2sw$$

- 5 Work out the value of $a^2 - 4a$ when $a = 10$

[2 marks]

$$10^2 - 4 \times 10$$

$$= 100 - 40$$

$$= 60$$

Answer 60

Turn over for the next question



- 6** 16 people were asked to name their favourite fruit juice.
Here are the results.

Favourite juice	Frequency
Apple	6
Grapefruit	1
Orange	4
Mango	5

- 6 (a)** One of the people was picked at random.

Work out the probability that their favourite juice was orange **or** mango.

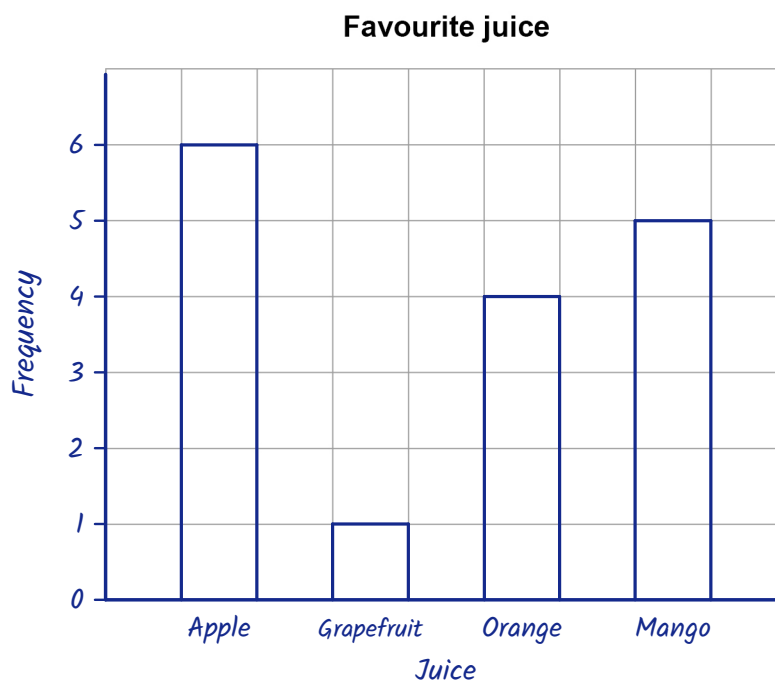
$$4 + 5 = 9$$

[1 mark]

Answer $\frac{9}{16}$

- 6 (b)** On the grid, draw a bar chart to represent the results.

[3 marks]



7

6 cakes cost £10.74

Work out the cost of 11 of these cakes.

[2 marks]

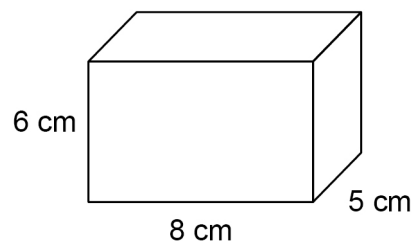
$$10.74 \div 6 = 1.79 \text{ (one cake)}$$

$$1.79 \times 11 = 19.69$$

Answer £ 19.69

8

Here is a cuboid.



Work out the volume.

[1 mark]

$$8 \times 5 \times 6 = 240$$

Answer 240 cm³



9

Work out two numbers that
are multiples of 9
and
have a difference of 54

[2 marks]

$$9 \times 2 = 18 \quad 9 \times 8 = 72$$

$$72 - 18 = 54$$

Answer 18 and 72

10

Convert 11.2 kilometres into miles.

Use 8 km = 5 miles

[2 marks]

$$11.2 \div 8 = 1.4$$

$$1.4 \times 5 = 7$$

Answer 7 miles



11

Annie spends these amounts in four shops using £20 notes, £10 notes and £5 notes.

Shop A	£65
Shop B	£40
Shop C	£115
Shop D	£75

In each shop she

pays the exact amount

uses the **smallest** possible number of notes.

Work out the total number of each note she uses.

[3 marks]

$$A \quad £65 = 20 + 20 + 20 + 5 \quad (3 \times £20, 1 \times £5)$$

$$B \quad £40 = 20 + 20 \quad (2 \times £20)$$

$$C \quad £115 = 5 \times 20 + 10 + 5 \quad (5 \times £20, 1 \times £10, 1 \times £5)$$

$$D \quad £75 = 3 \times 20 + 10 + 5 \quad (3 \times £20, 1 \times £10, 1 \times £5)$$

$$£20 \text{ notes: } 3 + 2 + 5 + 3 = 13$$

$$£10 \text{ notes: } 1 + 1 = 2 \quad £5 \text{ notes: } 1 + 1 + 1 = 3$$

Number of £20 notes 13

Number of £10 notes 2

Number of £5 notes 3



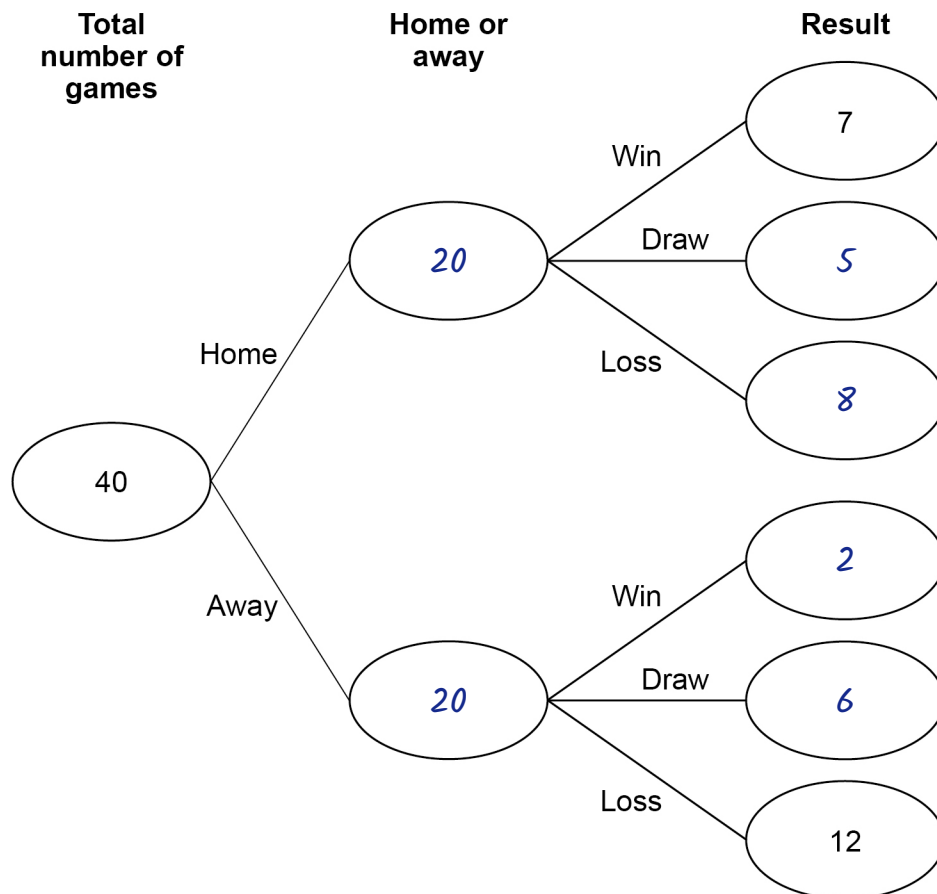
- 12** A sports team played 40 games.
Half were home games and half were away games.
Each game was a win, a draw or a loss.

Of the **home** games, $\frac{2}{5}$ were losses.

Of the **away** games, $\frac{1}{10}$ were wins.

- 12 (a)** Complete the frequency tree.

[4 marks]



Home: $\frac{2}{5} \times 20 = 8$ losses
 $20 - 7 - 8 = 5$ draws

Away: $\frac{1}{10} \times 20 = 2$ wins
 $20 - 2 - 12 = 6$ draws



12 (b) The team gets

6 points for a win

3 points for a draw

0 points for a loss.

Work out the **total** number of points that the team got.

[2 marks]

$$\text{Wins} = 7 + 2 = 9 \quad 9 \times 6 = 54$$

$$\text{Draws} = 5 + 6 = 11 \quad 11 \times 3 = 33$$

$$\text{Losses} = 8 + 12 = 20 \quad 20 \times 0 = 0$$

$$\text{Total} = 54 + 33 + 0 = 87$$

Answer 87

13 Factorise fully $50x + 100$

[2 marks]

HCF of 50 and 100 is 50

Answer $50(x + 2)$



- 14 Some buttons are red or blue in the ratio red : blue = 3 : 5

What fraction of the buttons are red?

Circle your answer.

[1 mark]

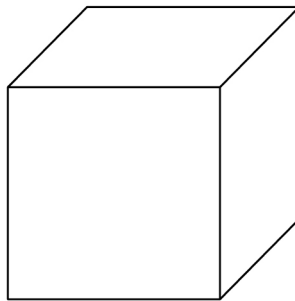
$$\frac{2}{5}$$

$$\frac{3}{5}$$

$$\frac{3}{8}$$

$$\frac{5}{8}$$

- 15 Which of these is a correct statement about a cube?



Tick **one** box.

[1 mark]

☒

It has 12 edges.

☐

It has 12 faces.

☐

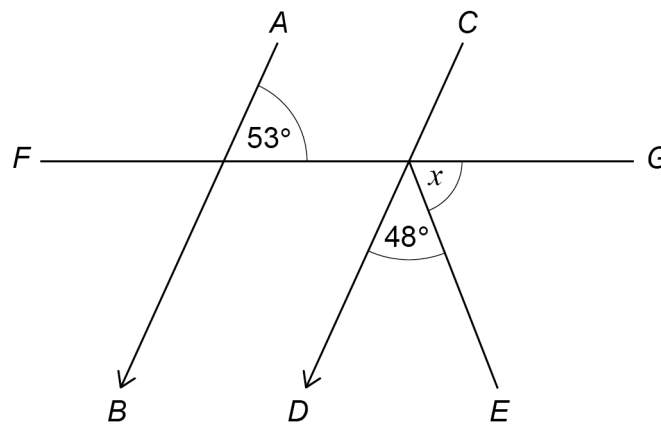
It has 12 planes.

☐

It has 12 vertices.



16

 AB is parallel to CD . FG is a straight line.Not drawn
accuratelyWork out the size of angle x .**[3 marks]***Angle between FG and the line to $D = 53^\circ$* *(corresponding angles, AB parallel to CD)**Angles on a straight line add up to 180°*

$$x + 53 + 48 = 180$$

$$x = 180 - 101 = 79$$

Answer 79 degrees

Turn over ►



17

Harry and his sister Jess have some money in the ratio Harry : Jess = 1 : 4

Harry has £7.35

They pay £16.99 for a present for a friend.

Harry uses $\frac{1}{3}$ of his money.

Jess pays the rest.

How much money does Jess have left?

[4 marks]

$$\text{Jess has } 7.35 \times 4 = £29.40$$

$$\text{Harry uses } 7.35 \div 3 = £2.45$$

$$\text{Jess pays } 16.99 - 2.45 = £14.54$$

$$\text{Jess has left } 29.40 - 14.54 = £14.86$$

Answer £ 14.86



18 Solve $10x - 3 = 21$ **[2 marks]**

$$10x = 21 + 3$$

$$10x = 24$$

$$x = 24 \div 10$$

$$x = \underline{\hspace{2cm} 2.4 \hspace{2cm}}$$

19 Work out which of these fractions is closer in value to 0.5

$$\frac{5}{16}$$

$$\frac{17}{25}$$

You **must** show your working.**[2 marks]**

$$5 \div 16 = 0.3125 \quad 0.5 - 0.3125 = 0.1875$$

$$17 \div 25 = 0.68 \quad 0.68 - 0.5 = 0.18$$

$$0.18 < 0.1875 \text{ so } 17/25 \text{ is closer to } 0.5$$

$$\text{Answer } \underline{\hspace{2cm} \frac{17}{25} \hspace{2cm}}$$

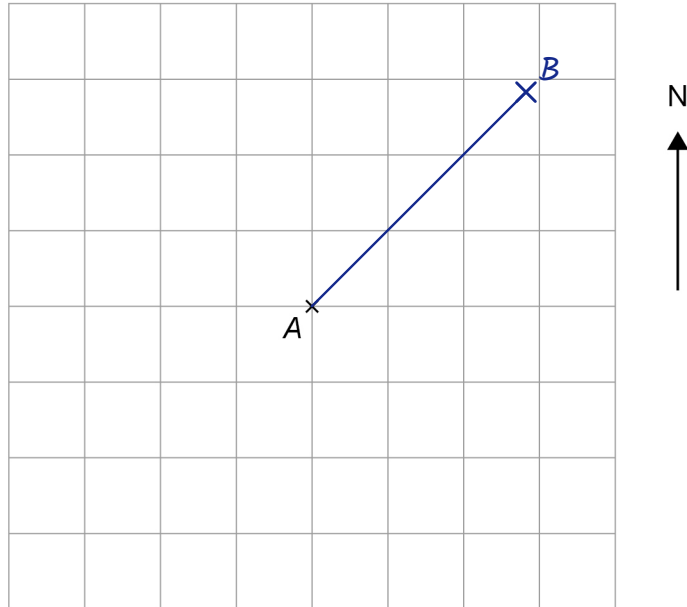


20 (a) Point B is 400 metres north east of point A .

Mark point B on the centimetre grid.

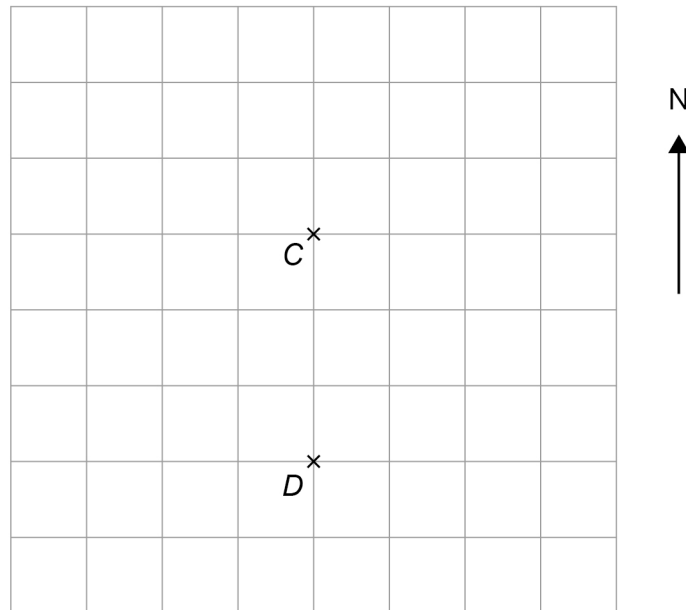
Use a scale of 1 centimetre represents 100 metres.

[2 marks]



Points C and D are shown on a different centimetre grid.

Scale: 1 : 1000



- 20 (b) Work out the bearing of D from C .

[1 mark]

Answer 180°

- 20 (c) Work out the actual distance, in metres, of D from C .

Use the scale 1 : 1000

[1 mark]

$CD = 3 \text{ cm on the grid}$

$3 \times 1000 = 3000 \text{ cm} = 30 \text{ m}$

Answer 30 metres



21

Lynn works as a bus driver.

She is paid £10.80 per hour for the first 38 hours she works each week.

She is paid 25% **more** per hour for each extra hour she works.

One week, Lynn was paid £491.40

In total, how many hours did she work that week?

You **must** show your working.

[5 marks]

$$\text{First 38 hours: } 38 \times 10.80 = £410.40$$

$$\text{Extra pay: } 491.40 - 410.40 = £81$$

$$\text{Overtime rate: } 10.80 \times 1.25 = £13.50 \text{ per hour}$$

$$\text{Extra hours: } 81 \div 13.50 = 6$$

$$\text{Total: } 38 + 6 = 44 \text{ hours}$$

Answer 44 hours



22 The square root of x is 4

Circle the value of x^2

[1 mark]

256

2

16

8

23 Here is a rule for a sequence.

After the first two terms, each term is the sum of the previous two terms.

The first five terms are p 23 q 57 r

Work out the values of p , q and r .

[2 marks]

$$23 + q = 57 \quad \text{so} \quad q = 57 - 23 = 34$$

$$p + 23 = q \quad \text{so} \quad p = 34 - 23 = 11$$

$$r = q + 57 = 34 + 57 = 91$$

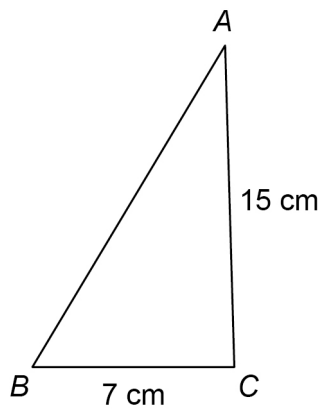
$$p = 11$$

$$q = 34$$

$$r = 91$$



24 Here is triangle ABC .



Not drawn
accurately

24 (a) Assume that angle $ACB = 90^\circ$

Work out the length AB .

[3 marks]

$$AB^2 = 7^2 + 15^2$$

$$AB^2 = 49 + 225 = 274$$

$$AB = \sqrt{274} = 16.552...$$

Answer 16.6 cm



24 (b) The actual length AB is greater than the answer to part (a).

What does this mean about angle ACB ?

Tick **one** box.

[1 mark]

☐

It is 90°

☐

It is less than 90°

☒

It is more than 90°

☐

It could be any of the above.

25 Rearrange $g = 3h - 1$ to make h the subject.

[2 marks]

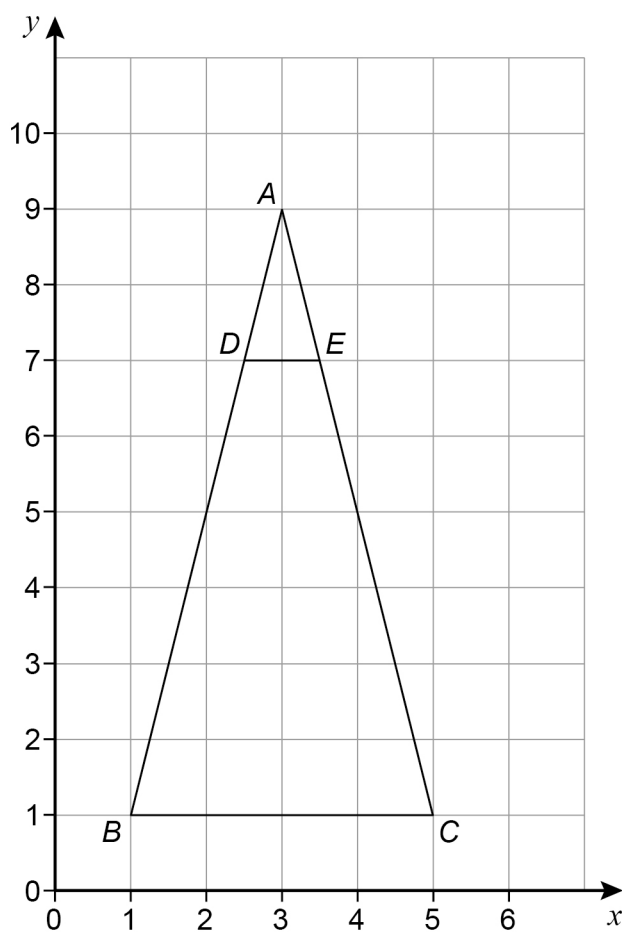
$$g = 3h - 1$$

$$g + 1 = 3h$$

Answer $h = \frac{g + 1}{3}$



26



Describe fully the **single** transformation that maps triangle ABC to triangle ADE .

[3 marks]

Enlargement

scale factor $\frac{1}{4}$

centre (3, 9)

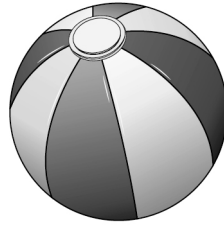


27

A ball contains 5000 cm^3 of air.

More air is pumped into the ball at a rate of 160 cm^3 per second.

The ball is full of air when it becomes a sphere with radius 15 cm



$$\text{Volume of a sphere} = \frac{4}{3} \pi r^3 \text{ where } r \text{ is the radius}$$

Does it take **less than** 1 minute to fill the ball?

You **must** show your working.

[4 marks]

$$\text{Volume of ball} = \frac{4}{3} \times \pi \times 15^3$$

$$= 14137.166... \text{ cm}^3$$

$$\text{Air still needed} = 14137.166... - 5000 = 9137.166... \text{ cm}^3$$

$$\text{Time} = 9137.166... \div 160 = 57.107... \text{ seconds}$$

$$57.1 \text{ seconds} < 60 \text{ seconds}$$

Yes, it takes less than 1 minute to fill the ball.



28

 p is a positive number. n is a negative number.

For each statement, tick the correct box.

[4 marks]

	Always true	Sometimes true	Never true
$p + n$ is positive	☐	☒	☐
$p - n$ is positive	☒	☐	☐
$p^2 + n^2$ is positive	☒	☐	☐
$p^3 \div n^3$ is positive	☐	☐	☒

$p = 5, n = -2$: 3 positive; $p = 2, n = -5$: -3 negative

$p - n = p + \text{a positive number}$, so always positive

squares are always positive

p^3 positive, n^3 negative, so $p^3 \div n^3$ is negative

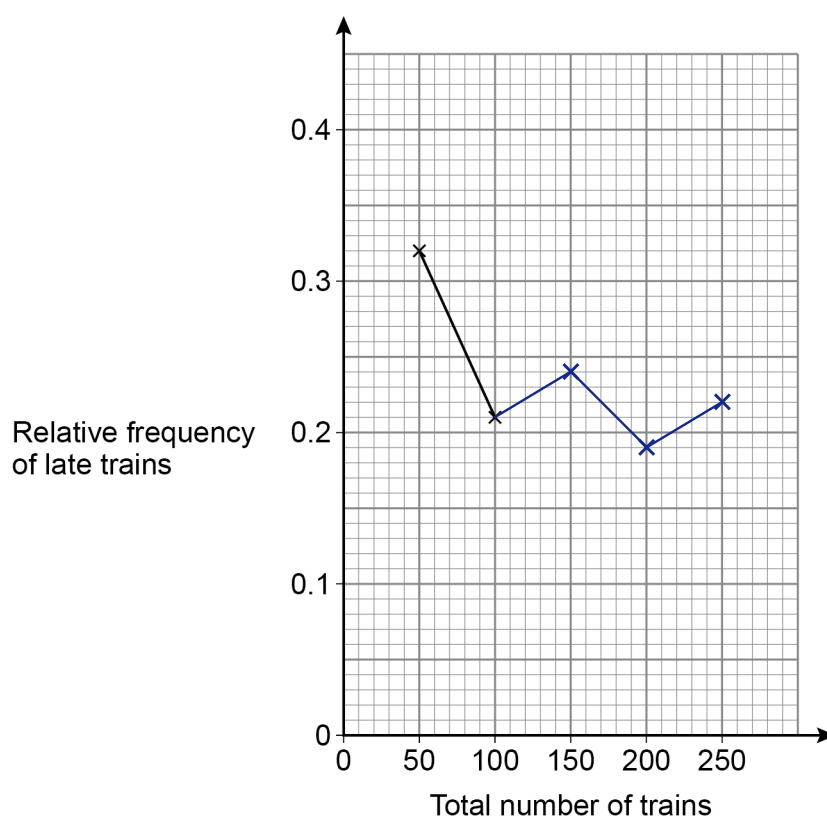


- 29** 250 trains arrived at a station.
The number of trains that were late was recorded after every 50 trains.
The table shows some information about the results.

Total number of trains	50	100	150	200	250
Total number of late trains	16	21	36	38	55
Relative frequency of late trains	0.32	0.21	0.24	0.19	0.22

- 29 (a)** Complete the relative frequency graph.

[3 marks]



- 29 (b)** Write down the best estimate of the probability that a train arriving at the station is late.

[1 mark]

Answer 0.22

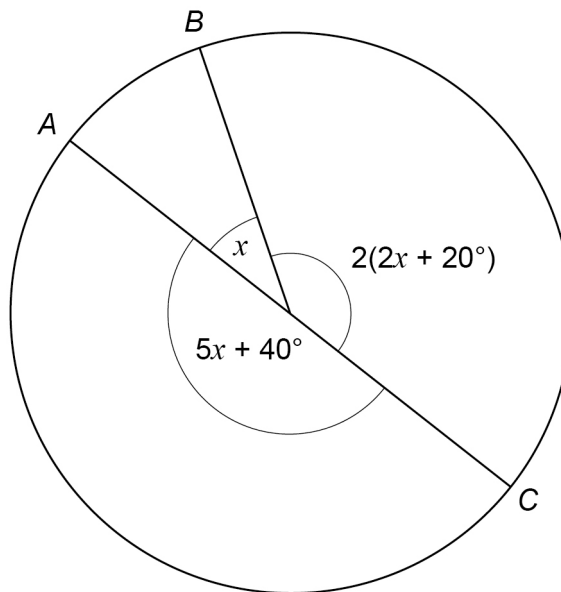
Turn over ►



30

A , B and C are three points on a circle.
The radii from A , B and C are shown.

Not drawn
accurately



Is AC a diameter of the circle?

You **must** show your working.

[3 marks]

O is the centre. Angle AOB + angle $BOC = x + 2(2x + 20)$

$$= x + 4x + 40$$

$$= 5x + 40$$

The other angle AOC is also $5x + 40$

Angles at a point add up to 360° ,

$$\text{so each angle} = 360 \div 2 = 180^\circ$$

So AOC is a straight line through the centre O .

Yes, AC is a diameter.



31

A straight line

has gradient 6

and

passes through the point (3, 19)

Work out the equation of the line.

Give your answer in the form $y = mx + c$ **[3 marks]**

$$y = 6x + c$$

$$19 = 6 \times 3 + c$$

$$19 = 18 + c$$

$$c = 1$$

$$y = 6x + 1$$

Answer $y = 6x + 1$ **END OF QUESTIONS**

There are no questions printed on this page

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