

Please write clearly in block capitals.

Centre number

Candidate number

Surname _____

Forename(s) _____

Candidate signature _____

GCSE Mathematics



Higher

Paper 2

Calculator

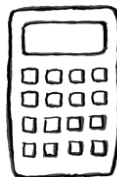
Summer 2018

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 the answer book.

Advice

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

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

Teacher

Class

8300/MissB/2H

Practice Paper Overview

Q	Topic	Mark	Total
1	Resultant Vectors		1
2	Geometric Progression		1
3	Bearings		1
4	Gradient of a Line		1
5	Factorise and Solve		2
6	Reverse Percentage		3
7	Form and Solve Equations		3
8	Venn Diagram Problem		5
9	Right-Angled Trigonometry		2
10	Identities		4
11	Volume of a Cone		5
12	Probability Tree		3
13	Quadratic Graphs		5
14	Reverse Averages		2
15	Functions		3
16	Ratio Problem		3
17	Regional Inequality Graphs		3
18	Area of Sector and Pythagoras' Theorem		4
19	Compound and Successive Interest		5
20	Histogram – Draw and Interpret		5
21	Circle Theorems		4
22	Recognise a reciprocal graph		1
23	Averages from a Table		3
24	Equations of a Circle		1
25	Transformations		1
26	Travel Graphs – Acceleration		3
27	Iteration		3
28	Rearranging Formulae		3
		Total	80

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

Do not write
outside the
box

1 Work out

$$\begin{pmatrix} -3 \\ -5 \end{pmatrix} - \begin{pmatrix} -2 \\ 4 \end{pmatrix}$$

[1 mark]

Circle your answer.

$$\begin{pmatrix} -5 \\ 1 \end{pmatrix}$$

$$\begin{pmatrix} 1 \\ 1 \end{pmatrix}$$

$$\begin{pmatrix} -5 \\ -9 \end{pmatrix}$$

$$\begin{pmatrix} -1 \\ 1 \end{pmatrix}$$

$$\begin{pmatrix} -1 \\ -9 \end{pmatrix}$$

2 Circle the geometric progression.

[1 mark]

2 8 18 32

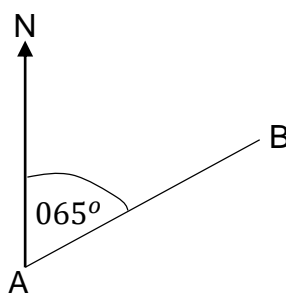
2 4 8 16

1 8 27 64

2 8 14 20

3 The bearing of B from A is 065° .

Not drawn
accurately



Circle the bearing of A from B.

[1 mark]

245°

115°

295°

265°

- 4 Circle the gradient of the straight line

$$3y + 2x - 5 = 0$$

[1 mark]

2

$\frac{2}{3}$

$\frac{3}{2}$

$-\frac{2}{3}$

- 5 Factorise and solve

$$x^2 - 5x - 24 = 0$$

[2 marks]

Answer _____

- 6 In a sale, the original price of a TV was reduced by $\frac{1}{8}$

The sale price of the TV is £332.50

Work out the original price.

[3 marks]

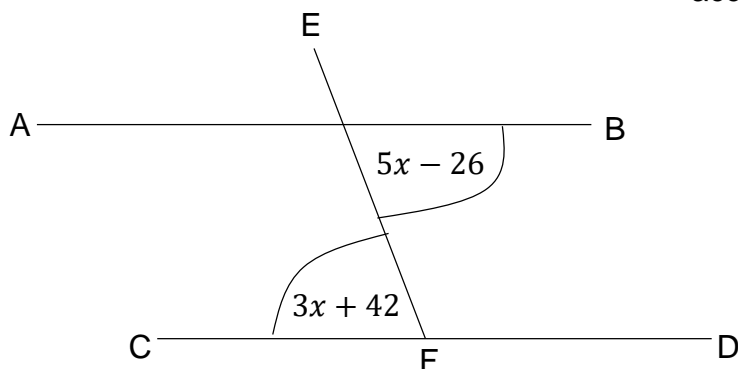
Answer _____

7 AB, CD and EF are straight lines.

AB is parallel to CD.

All angles are in degrees.

Not drawn
accurately



Find the size of angle EFD

[3 marks]

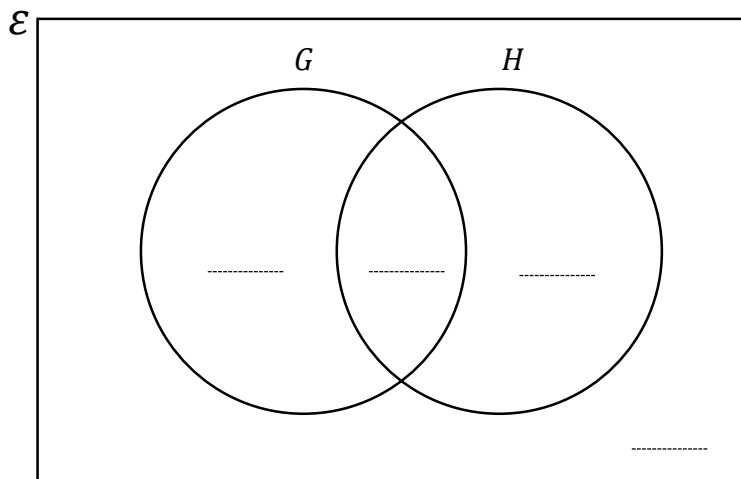
Answer _____

8 In the Venn diagram

$\varepsilon = 80$ students

$G =$ students who take Geography

$H =$ students who take History



45% of the students study only Geography or History.

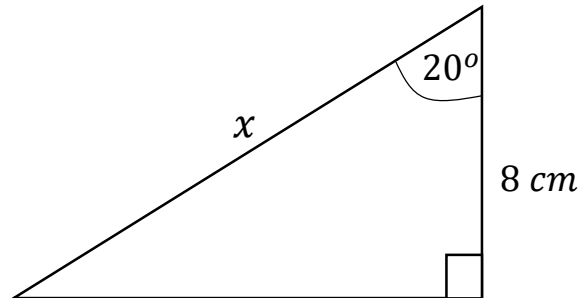
Students who only study Geography or History are in the ratio of 3:1.

The number of students that study geography is double the number that study History.

Complete the Venn diagram.

[5 marks]

9 Work out the length x .



[2 marks]

Answer _____ cm

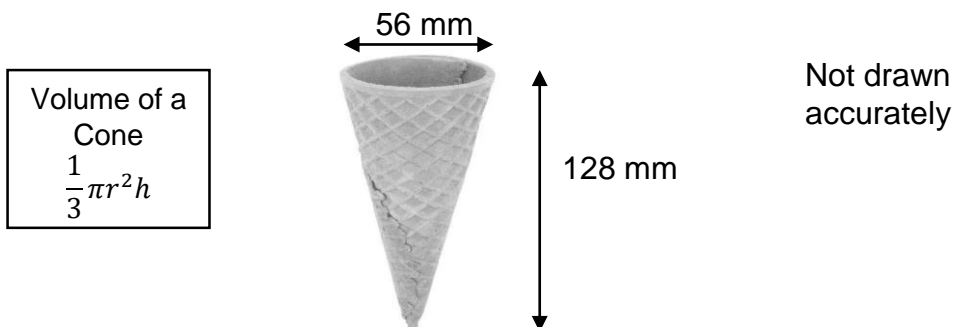
10 Work out the values of a and b in the identity.

$$4(x + 5) - 2(ax - 7) \equiv b - 2x$$

[4 marks]

$a =$ _____ $b =$ _____

- 11 An ice cream cone has a diameter of 56 mm and height of 128 mm.



It is filled at a rate of 3.8 ml per second.

$$1 \text{ ml} = 1000 \text{ mm}^3$$

Assume the cones are filled continuously in a factory.

- 11 (a) How many cones could be filled with ice cream in 5 minutes?

You must show your working out.

[4 marks]

Answer _____ cones

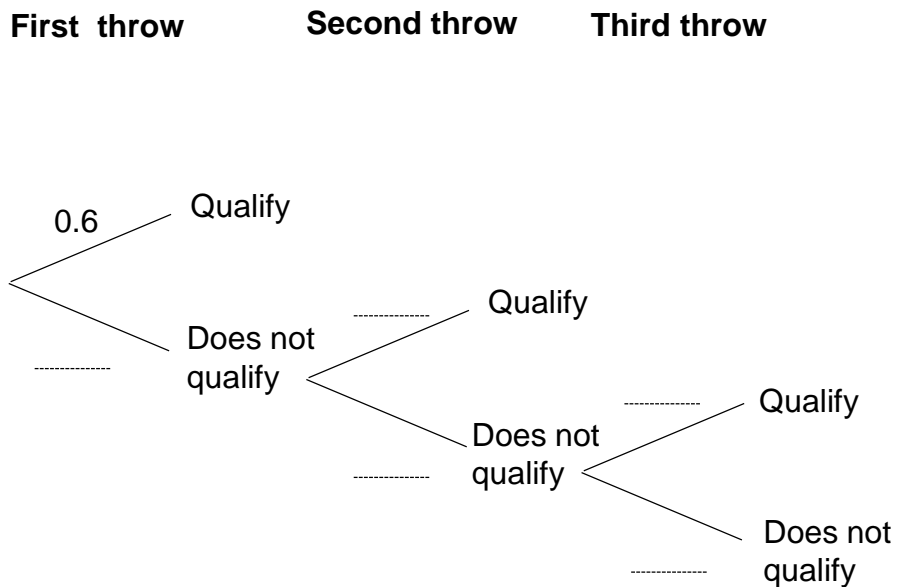
- 11 (b) If the cones needed to be manually placed underneath the ice cream machine each time. What affect would this have on the amount of cones that are filled with ice cream within 5 minutes?

[1 mark]

- 12** On Saturday, Bradley takes part in a javelin competition.
He has to throw at least 80 metres to qualify for the final on Sunday.
He has three throws to qualify.
If he throws at least 80 metres he will not have to throw again on Saturday.
Each time Bradley throws, the probability he throws at least 80 metres is 0.6.
Assume each throw is independent.

12 (a) Complete the tree diagram.

[1 marks]



12 (b) Work out the probability that he will need the third throw to qualify.

[2 marks]

Answer _____

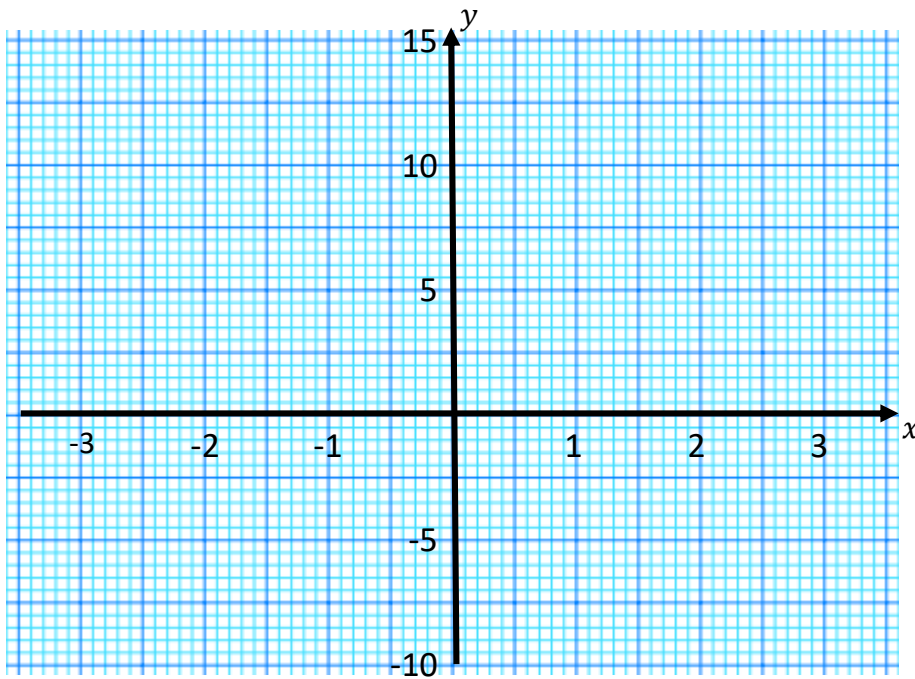
13 (a) Complete the table of values for $y = x^2 + 2x - 5$.

[2 marks]

x	-3	-2	-1	0	1	2	3
y	-2	-5		-5			10

13 (b) On the grid, draw the graph of $y = x^2 + 2x - 5$.

[2 marks]



13 (c) Circle the coordinates of the turning point of the curve.

[1 mark]

$(0, -5)$

$(-1, -6)$

$(1.4, 0)$

$(-6, -1)$

- 14** In a brass band, the mean age of 24 players is 48 years.

Rachel joins the band.

The mean age of all 25 players is now 47 years.

Work out the age of Rachel.

[2 marks]

Answer _____

- 15** The functions f and g are such that

$$f(x) = 2x + 4$$

$$g(x) = x^2 - 2$$

- 15 (a)** Circle the value of $f^{-1}(x)$.

[1 mark]

$$\frac{x}{2} - 4$$

$$2(x - 4)$$

$$\frac{1}{2x + 4}$$

$$\frac{x - 4}{2}$$

- 15 (b)** Show that $gf(x) = 4x^2 + 16x + 14$

[2 marks]

- 16** Mustafa, Abdul and Mo share sweets in the ratio 3:5:6.

Mo Got 21 more sweets than Mustafa.

Work out the total number of sweets they shared.

[3 marks]

Answer _____

- 17** On the grid, shade the region that satisfies all these inequalities.

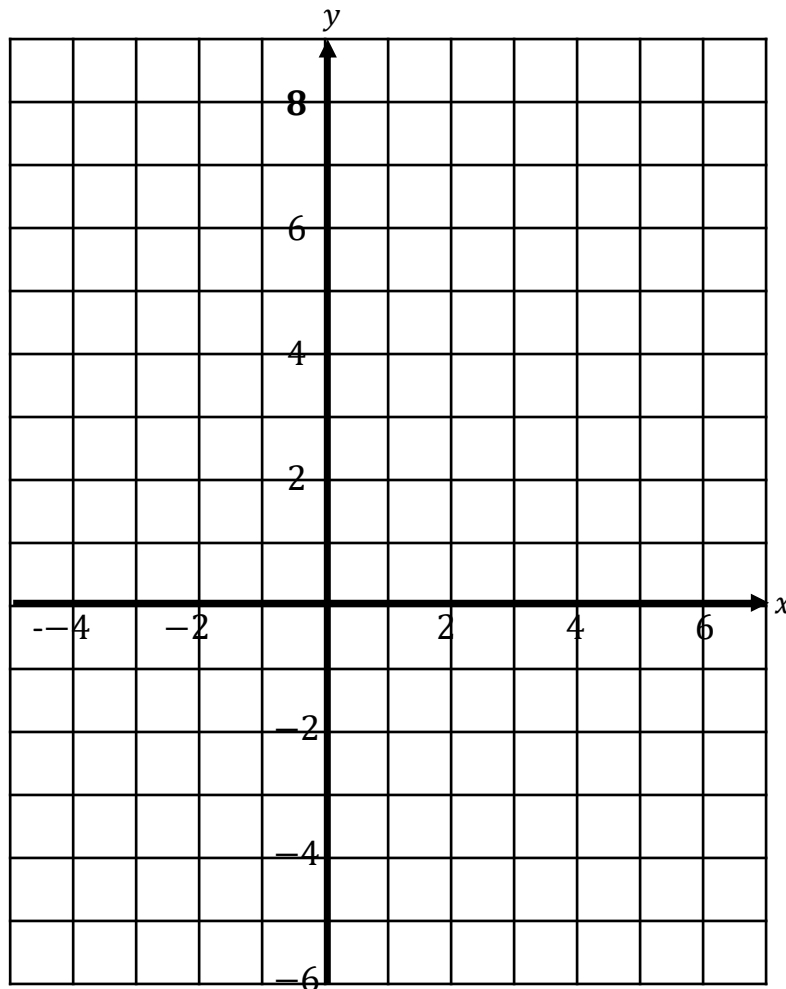
$$x > -1$$

$$x + y \leq 5$$

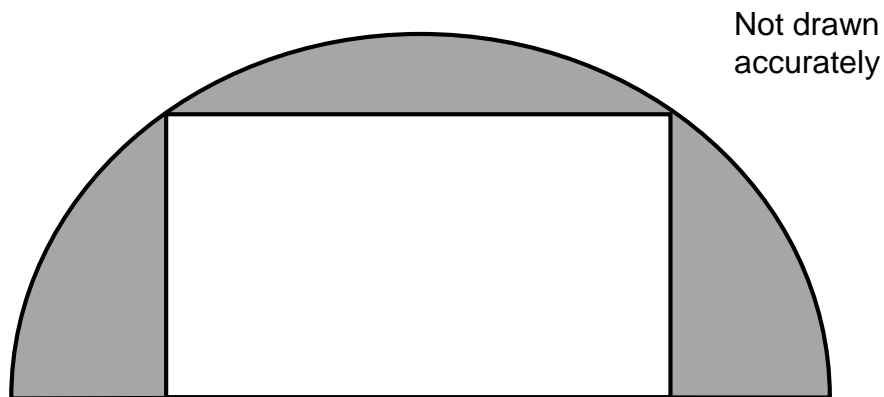
$$y \geq 2x - 1$$

Label the region R.

[3 marks]



- 18 The diagram shows a rectangle inside a semicircle.



The rectangle has dimensions 9.6 cm by 3.6 cm .

Work out the shaded area.

Give your answer correct to 3 significant figures.

[4 mark]

Answer _____ cm^2

19 Here are the interest rates for two accounts.

Account A
Interest: 4% for the first year 2% for the second year 1% for the third year
Withdrawals allowed at any time.

Account B
Interest: 2.4% per year compound interest.
No withdrawals allowed until the end of three years.

Daniel has £20 000 he wants to invest.

19 (a) Calculate which account would give him the most money if he invests his money for 3 years.

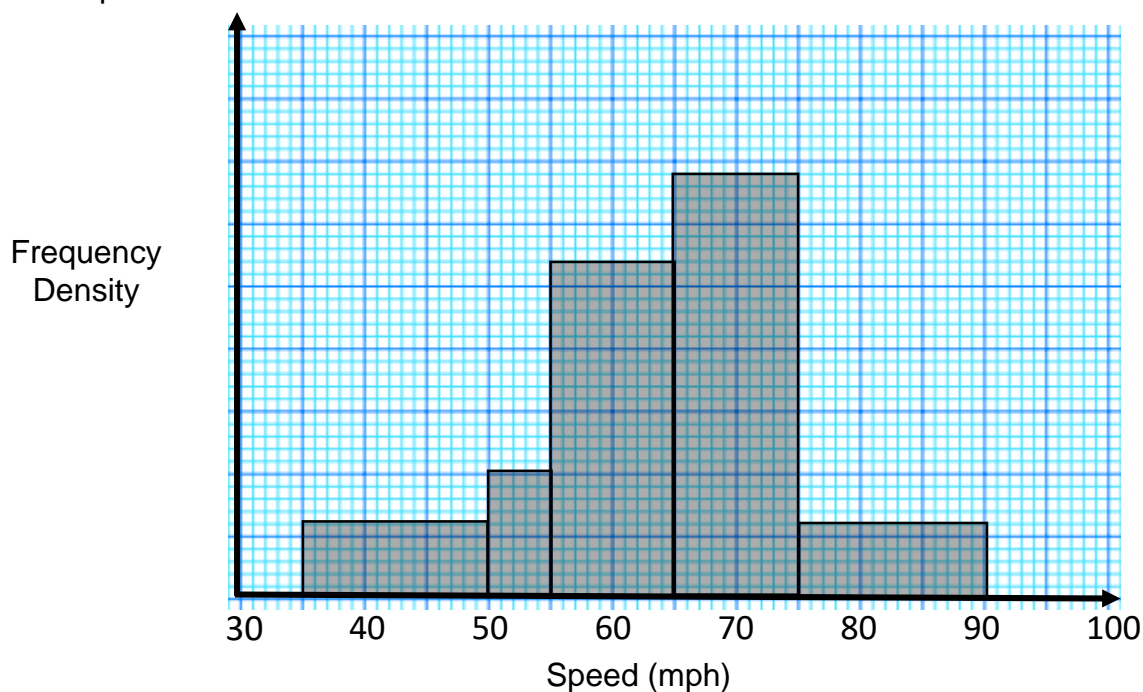
[4 marks]

Answer _____

19 (b) Explain why he might not want to use Account B.

[1 mark]

20 The incomplete table and histogram give some information about the speed of cars on the M1.



On a Friday evening a speed camera van measured the speed of the cars which passed the van.

There were 18 cars measured as travelling in the range $35 \leq \textit{speed} < 50$.

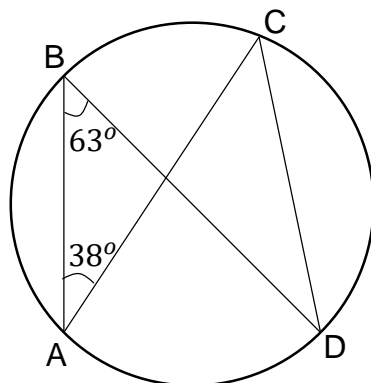
On the M1 motorway the speed limit is 70 miles per hour.

Work out the proportion of cars that were caught speeding.

[5 marks]

Answer _____

21

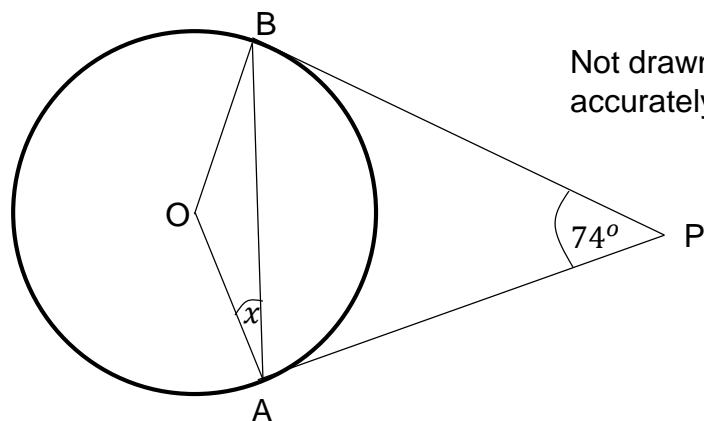
Not drawn
accurately

21 (a) Circle the size of angle ACD.

[1 mark]

 76° 63° 117° 38° 126°

21 (b)

Not drawn
accurately

A and B are points on the circumference of a circle, centre O.

PA and PB are tangents to the circle.

Angle APB is 74° .Work out the size of the angle marked x .

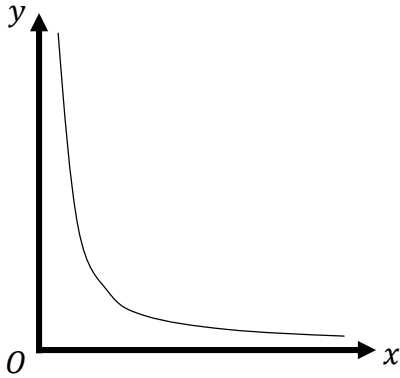
[3 marks]

Answer _____

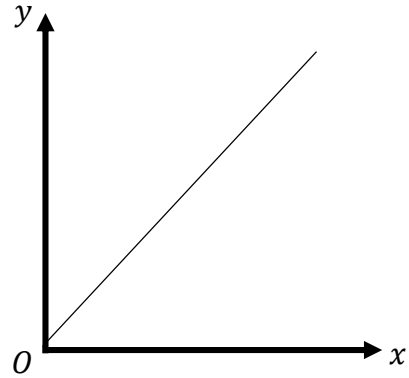
- 22** y is directly proportion to x .
Which graph shows this?
Circle the correct letter.

[1 mark]

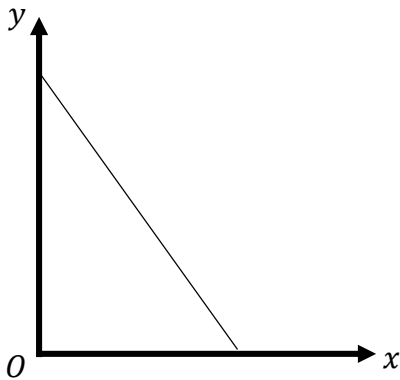
A



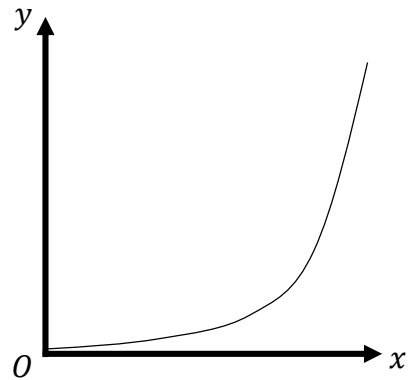
B



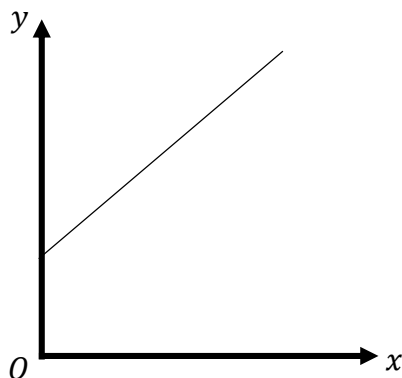
C



D



E



23 The table shows some information about the heights of 120 adults.

Height (h , cm)	Number of adults
$150 \leq h < 155$	12
$155 \leq h < 160$	26
$160 \leq h < 170$	31
$170 \leq h < 175$	37
$175 \leq h < 200$	14

23 (a) In which class interval is the median?

Circle your answer.

[1 mark]

$150 \leq h < 155$

$155 \leq h < 160$

$160 \leq h < 170$

$170 \leq h < 175$

$175 \leq h < 200$

23 (b) Kenan says

“30% of the adults measured are under 160cm tall.”

Does the data support this statement?

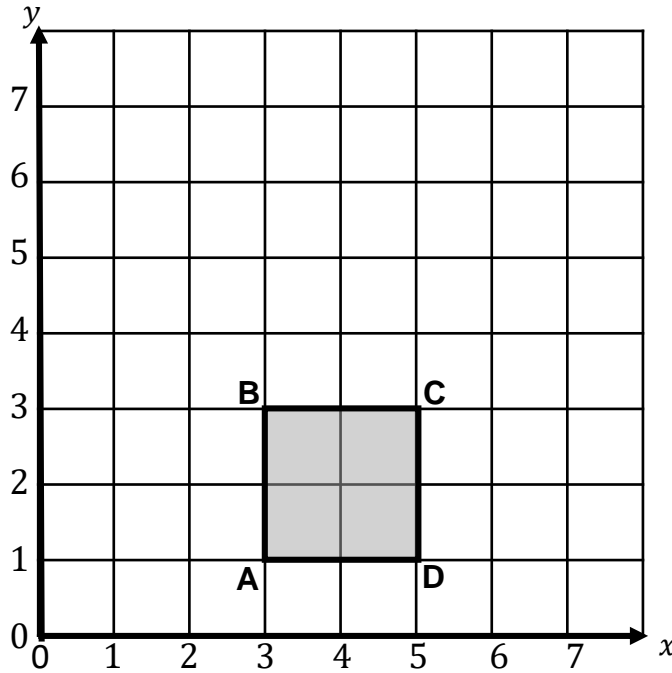
You must show your working.

Yes

No

[2 marks]

- 24** A square ABCD is drawn on a centimetre grid.



ABCD is reflected in the line $x = 3$ and
then rotated 90° clockwise from the centre (3,1).

Circle the number of invariant points.

[1 mark]

0 1 2 3 4

- 25** A circle has the equation

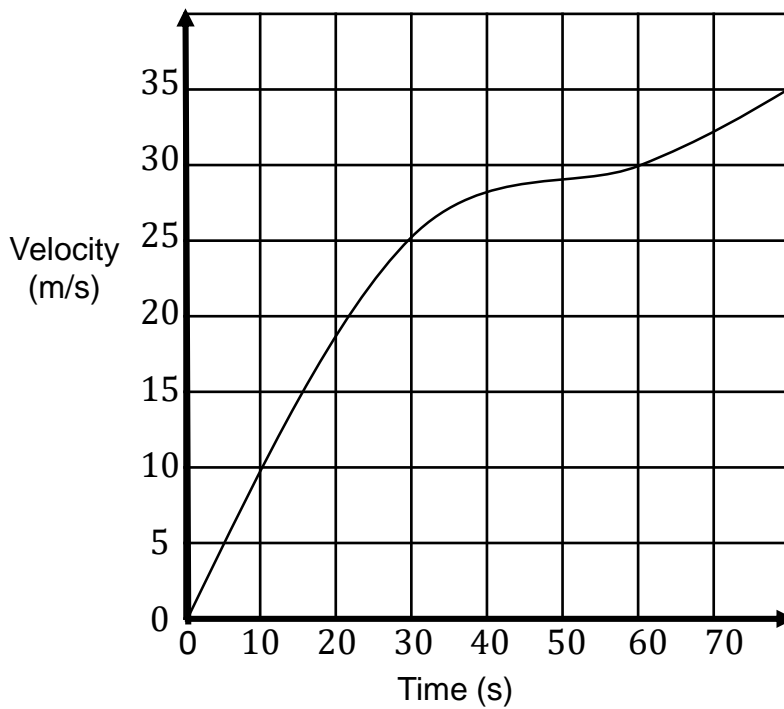
$$x^2 + y^2 = \frac{1}{16}$$

Circle the length of its radius.

[1 mark]

$\frac{1}{4}$ $\frac{1}{8}$ $\frac{1}{16}$ $\frac{1}{32}$

26 Here is a velocity-time graph for a car journey.



26 (a) Work out the average acceleration during the first 60 seconds.

[1 mark]

Answer _____ m/s^2

26 (b) Estimate the instantaneous rate of acceleration at 30 seconds.

[2 marks]

Answer _____ m/s^2

27 An approximate solution to the equation $x^3 - 10x - 5 = 0$ is found using this iterative process.

$$x_{n+1} = \frac{(x_n^3 - 5)}{10}$$

Use this iterative process to find a solution to 3 decimal places of $x^3 - 10x - 5 = 0$

Start with the value $x_1 = 2$

[3 marks]

Answer _____

28 Rearrange

[3 marks]

$$y = \frac{r - px}{x - p}$$

to make x the subject.

Answer _____

End of Questions

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