

Surname	Centre Number	Candidate Number
Other Names		0



GCSE

4370/06



S16-4370-06

**MATHEMATICS – LINEAR
PAPER 2
HIGHER TIER**

A.M. THURSDAY, 9 June 2016

2 hours

ADDITIONAL MATERIALS

A calculator will be required for this paper.

A ruler, a protractor and a pair of compasses may be required.

INSTRUCTIONS TO CANDIDATES

Use black ink or black ball-point pen. Do not use gel pen or correction fluid.

Write your name, centre number and candidate number in the spaces at the top of this page.

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

If you run out of space, use the continuation page at the back of the booklet, taking care to number the question(s) correctly.

Take π as 3.14 or use the π button on your calculator.

INFORMATION FOR CANDIDATES

You should give details of your method of solution when appropriate.

Unless stated, diagrams are not drawn to scale.

Scale drawing solutions will not be acceptable where you are asked to calculate.

The number of marks is given in brackets at the end of each question or part-question.

You are reminded that assessment will take into account the quality of written communication (including mathematical communication) used in your answer to question 8.

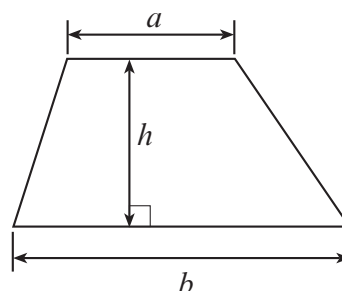
For Examiner's use only		
Question	Maximum Mark	Mark Awarded
1.	4	
2.	2	
3.	4	
4.	6	
5.	5	
6.	8	
7.	6	
8.	7	
9.	4	
10.	9	
11.	2	
12.	6	
13.	5	
14.	2	
15.	3	
16.	2	
17.	3	
18.	3	
19.	4	
20.	8	
21.	7	
Total	100	



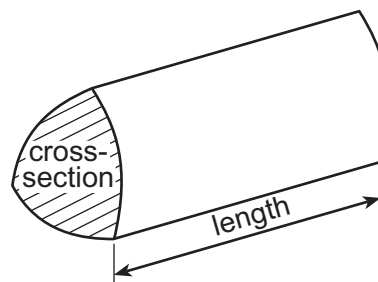
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Formula List

Area of trapezium = $\frac{1}{2}(a + b)h$

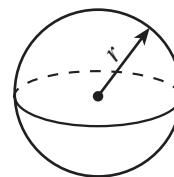


Volume of prism = area of cross-section \times length



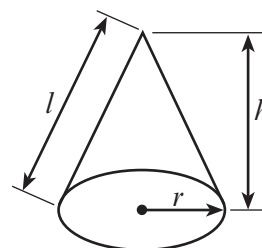
Volume of sphere = $\frac{4}{3}\pi r^3$

Surface area of sphere = $4\pi r^2$



Volume of cone = $\frac{1}{3}\pi r^2 h$

Curved surface area of cone = $\pi r l$

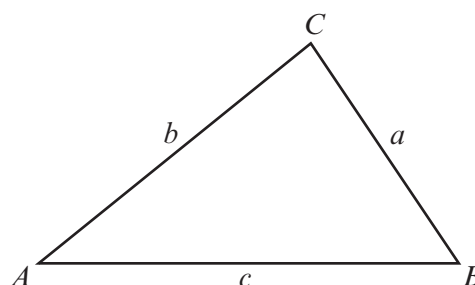


In any triangle ABC

Sine rule $\frac{a}{\sin A} = \frac{b}{\sin B} = \frac{c}{\sin C}$

Cosine rule $a^2 = b^2 + c^2 - 2bc \cos A$

Area of triangle = $\frac{1}{2}ab \sin C$



The Quadratic Equation

The solutions of $ax^2 + bx + c = 0$

where $a \neq 0$ are given by

$$x = \frac{-b \pm \sqrt{(b^2 - 4ac)}}{2a}$$



1. Given that $k = -3$, $m = 7$ and $p = 10$, find the value of the following expressions.

(a) $\frac{5(k^2 - m)}{p}$

[2]

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(b) $(2m)^3$

[2]

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2. Find the larger share when £1400 is shared in the ratio of 1 : 4.

[2]

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Larger share is £



3. In 2014, the average amount of paper used per person in China was 74 kg, and in the USA it was 228 kg.

(a) Insert a value, correct to 2 significant figures, in the following statement. [2]

'In 2014, on average, each person in the USA used times as much paper as each person in China.'

.....
.....

(b) Between 55% and 60% of the paper used in the USA is recycled paper. Insert values, correct to the nearest kg, in the following statement. [2]

'In 2014, of the average 228 kg of paper used by each person in the USA, between kg and kg of this was recycled paper.'

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4. (a)

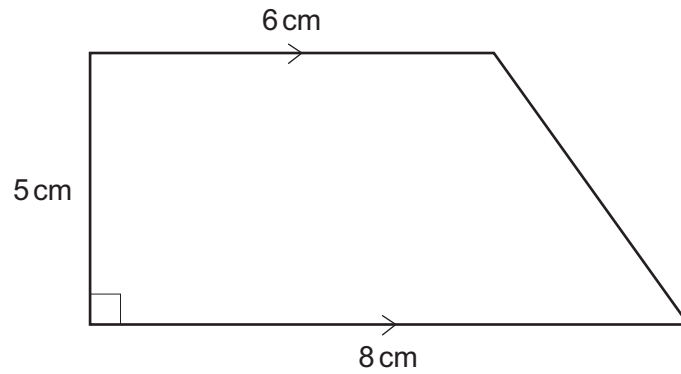


Diagram not drawn to scale

Calculate the area of the trapezium.

[2]

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Area = cm²

(b) Each exterior angle of a regular polygon is 30°. How many sides are there in this regular polygon?

[2]

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Number of sides =

(c) A cylinder has a radius of 4 cm and a height of 9 cm. Calculate the volume of the cylinder.

[2]

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Volume = cm³



Examiner
only

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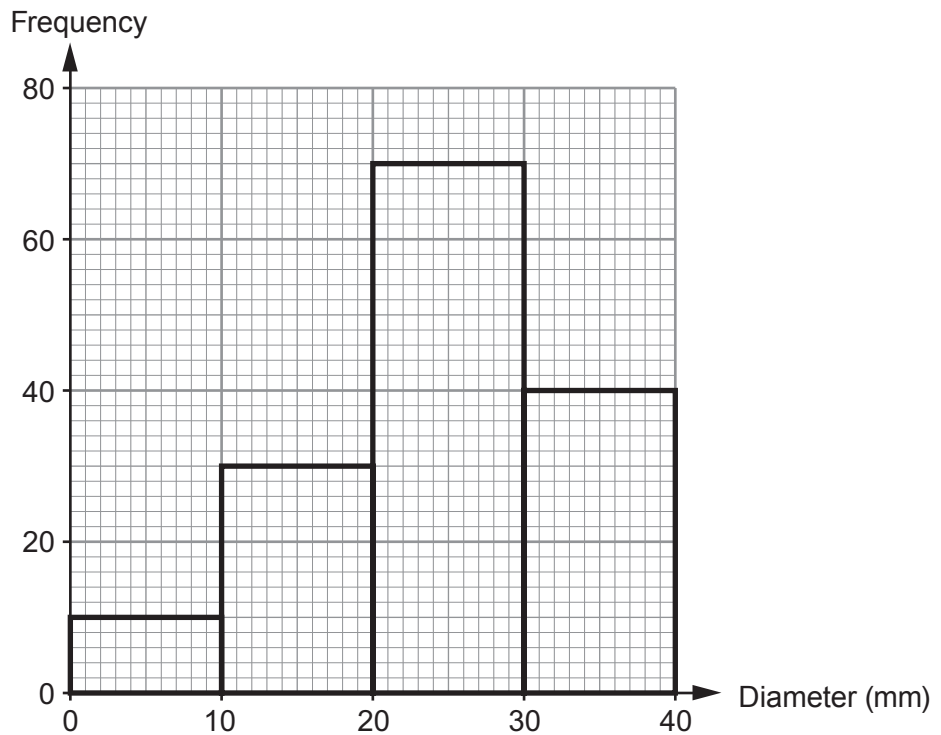
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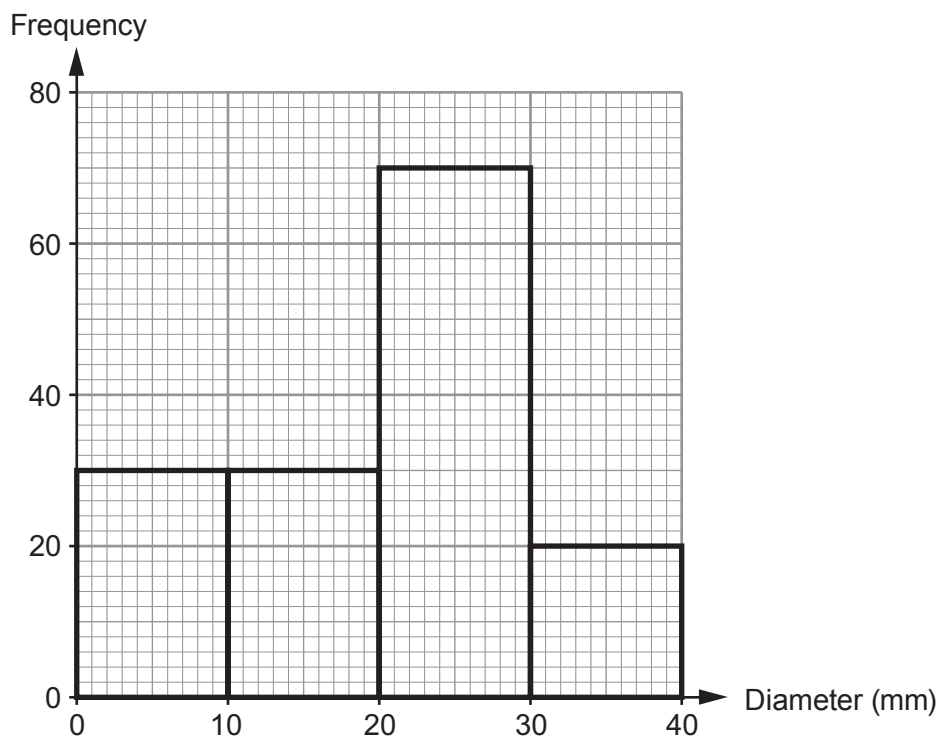


6. One day in November, Bryn and Luke cut some branches off some trees. The grouped frequency diagrams show the diameters of the branches they cut.

Branches cut by Bryn



Branches cut by Luke



- (a) How many of the branches that Luke cut had diameters between 10 mm and 30 mm? [1]
-



7. The table shows some of the values of $y = 3x^2 + x + 2$ for values of x from -2 to 3 .

(a) Complete the table by finding the value of y for $x = -1$ and $x = 2$. [2]

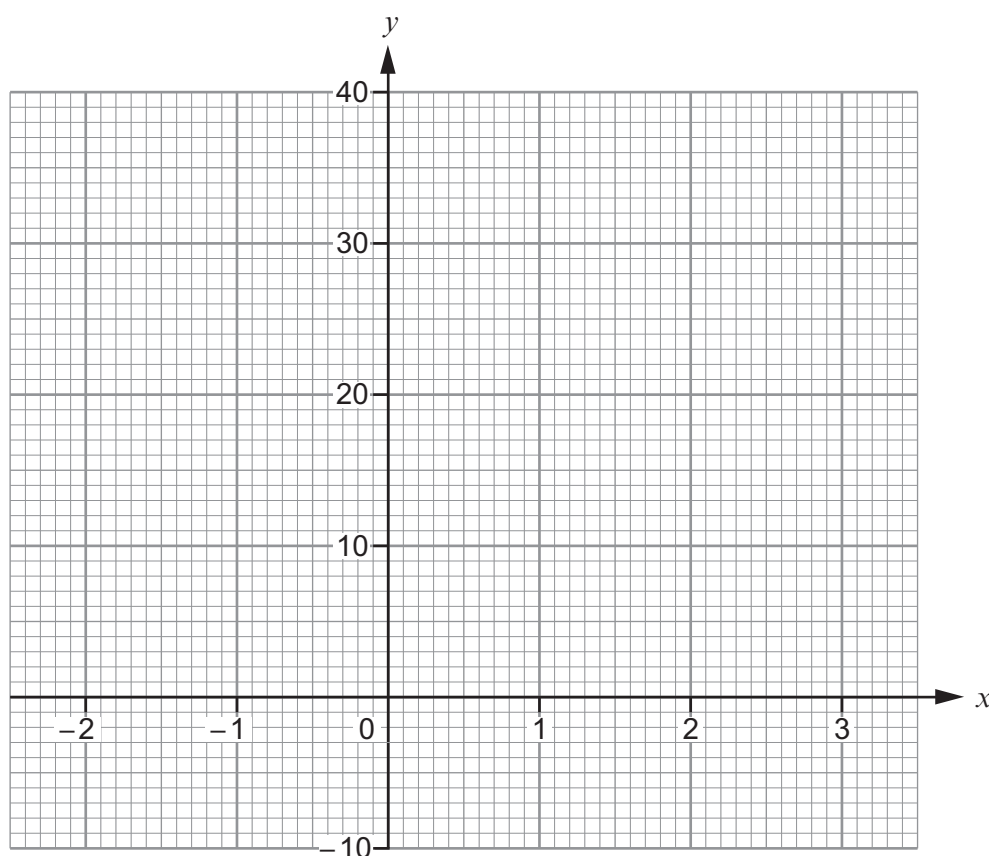
x	-2	-1	0	1	2	3
$y = 3x^2 + x + 2$	12		2	6		32

.....

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(b) On the graph paper below, draw the graph of $y = 3x^2 + x + 2$ for values of x from -2 to 3 . [2]



(c) Use your graph to solve the equation $3x^2 + x + 2 = 7$.

[2]

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10. (a)

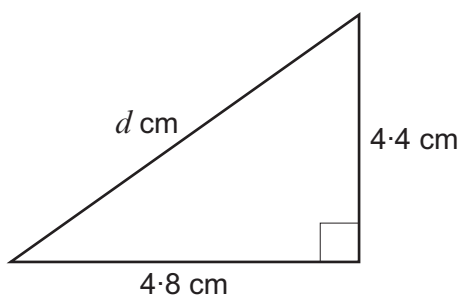


Diagram not drawn to scale

Calculate the value d .

[3]

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(b)

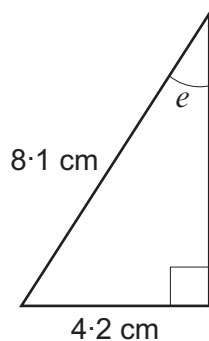


Diagram not drawn to scale

Calculate the size of angle e .

[3]

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(c)

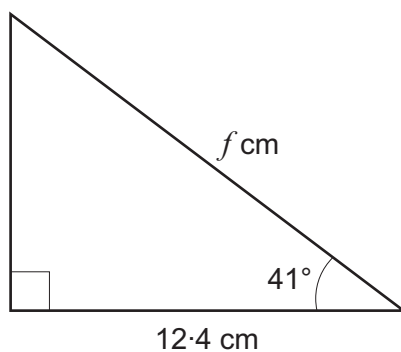


Diagram not drawn to scale

Calculate the value f .

[3]

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11. Simplify $5a^2b^3 \times 3a^5b$.

[2]

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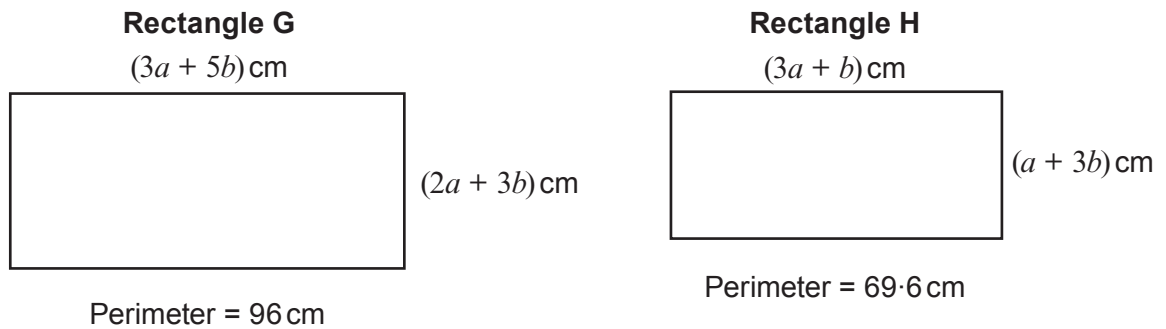
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12. The dimensions and perimeters of two rectangles, G and H, are shown below.



Diagrams not drawn to scale

Freya has written an equation for rectangle G:

$$10a + 16b = 96$$

(a) Write down an equation for rectangle H.

[1]

.....

.....



14. Evaluate the following.
Give your answer in standard form, correct to 2 significant figures. [2]

$$\frac{2.4 \times 10^5}{3.4^3 + \sqrt{5.6 \times 10^{-2}}}$$

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15. One of the two solutions of a quadratic equation is $x = -6$.
The quadratic equation is $x^2 + bx + 12 = 0$, where b is an integer.
Find the other solution of the equation.
You must show all your working. [3]

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16.

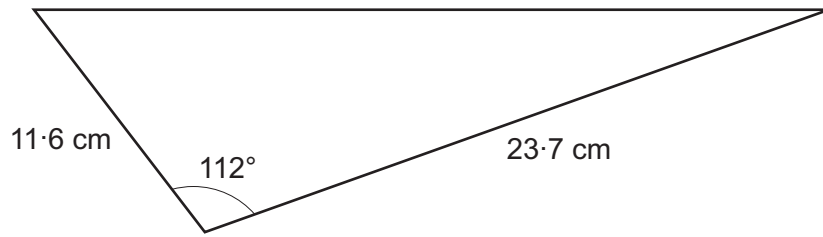


Diagram not drawn to scale

Calculate the area of the triangle.

[2]

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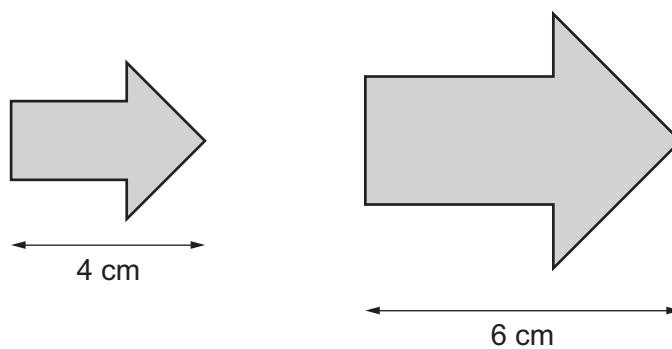
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17. The arrows shown below are similar.



The area of the smaller arrow is 7.6 cm^2 .
Calculate the area of the larger arrow.

[3]

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Area of the larger arrow is cm^2



18. Use the quadratic formula to solve the following equation.
Give your answers correct to 2 decimal places.

[3]

$$4x^2 + 7x - 5 = 0$$

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19. (a) You are given that y is inversely proportional to x^2 , and that $y = 50$ when $x = 3$.
Find an expression for y in terms of x .

[3]

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- (b) Use the expression you found in (a) to complete the following table.

[1]

x	$\frac{1}{2}$	3
y		50

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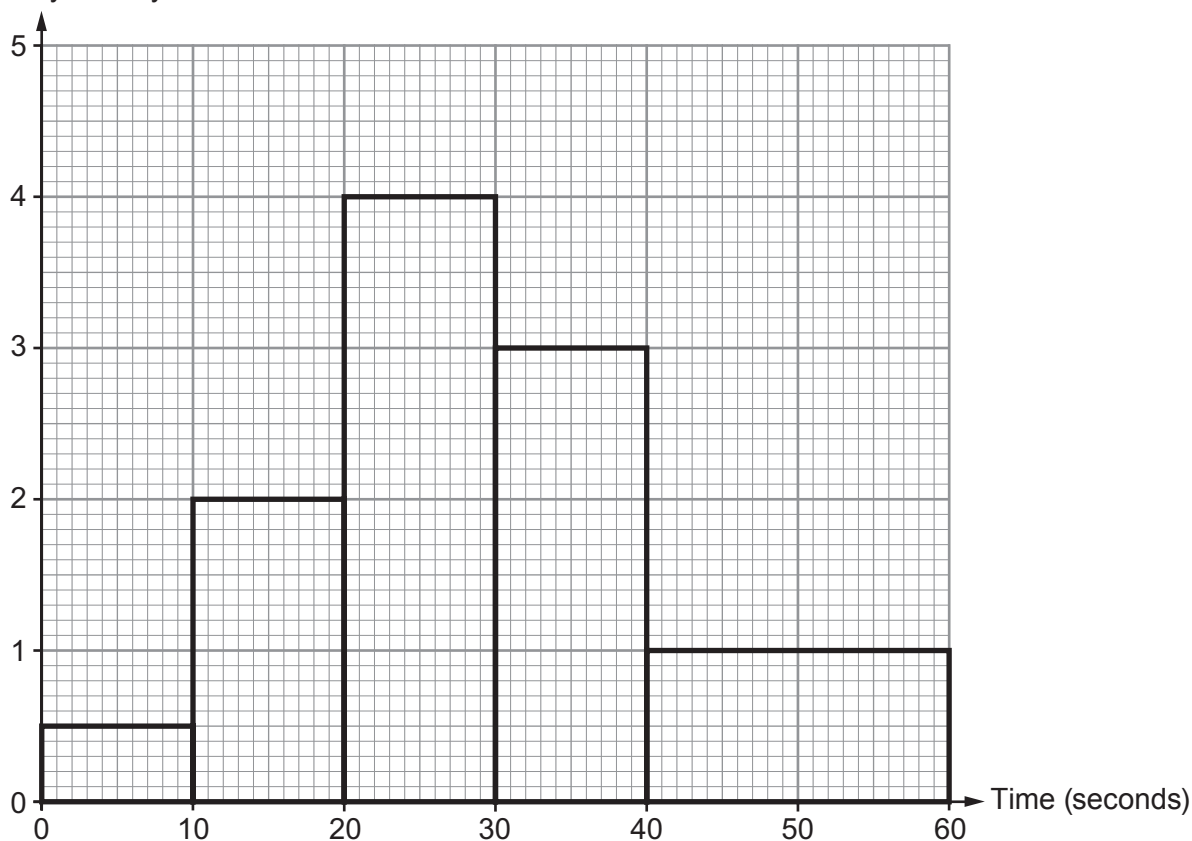
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20. A cinema investigates the time taken for people to be served at the pay desk. They carried out a survey between 2 p.m. and 2:30 p.m. on a Thursday. The histogram shows the results of the survey.

Frequency density



(a) How many people were served at the pay desk?

[3]

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.....

..... people



(b) Calculate an estimate for the number of people who were served in less than 12.5 seconds. [2]

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.....
.....

..... people

(c) The cinema target is to serve 80% of people in less than 40 seconds per person. How many more people than the target were served in less than 40 seconds? [3]

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..... extra people above the target

TURN OVER



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