AQA

NEW PRACTICE PAPER SET 2
Published November 2015

Please write clearly, in block capitals.

Centre number | | | | | | Candidate number | | | | |

Surname _____

Forename(s) _____

Candidate signature _____

GCSE MATHEMATICS

H

Higher Tier Paper 2 Calculator

Exam Date Morning 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 this answer book.

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

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

1 Here is a linear sequence.

5 13 21 29

Circle the expression for the nth term of the sequence.

[1 mark]

$n + 8$ $5n + 8$ $8n$ $8n - 3$

2 Circle the fraction that is equivalent to 0.05%

[1 mark]

$\frac{1}{2000}$ $\frac{1}{500}$ $\frac{1}{200}$ $\frac{1}{50}$

3 A straight line has equation $y = 6 - 2x$

Circle the gradient of the line.

[1 mark]

–2 2 $2x$ 6

4 y is directly proportional to x and k is a constant.

Circle the correct equation.

[1 mark]

$y = x + k$ $\quad$ $y = kx$ $\quad$ $y = \frac{k}{x}$ $\quad$ $y = x - k$

5 There are between 25 and 35 students in a class.

The ratio of boys to girls is 4 : 7

How many students are in the class?

[2 marks]

Answer _____

Turn over for the next question

6 (a) Solve the inequality $\frac{3x}{2} \leqslant 9$

[2 marks]

Answer _____

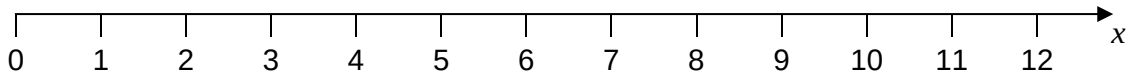
6 (b) Solve the inequality $4(x + 2) > 12$

[2 marks]

Answer _____

6 (c) Represent the solution set that satisfies **both** answers to parts (a) and (b) on the number line.

[1 mark]



7 This formula works out the tax you pay.

$$T = 0.2(E - 10\,600)$$

T is the tax you pay in pounds.

E is the amount you earn in pounds.

Alison pays £5200 tax.

Work out the amount she earns.

[3 marks]

Answer £ _____

8 Solve $x^2 = 30.25$

[2 marks]

Answer _____

9 Here are two piles of the same type of paper.

Each sheet of paper is $\frac{7}{1000}$ cm thick.

The taller pile is $10\frac{1}{2}$ cm high.

height of taller pile : height of shorter pile = 3 : 2

Work out the number of sheets of paper in the shorter pile.

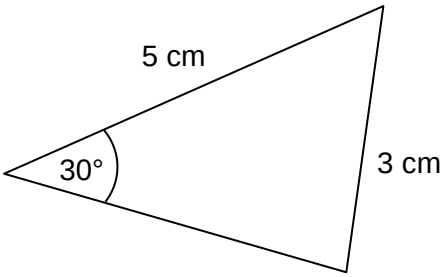
[3 marks]

Answer _____

10 Here are four triangles.

Not drawn accurately

A



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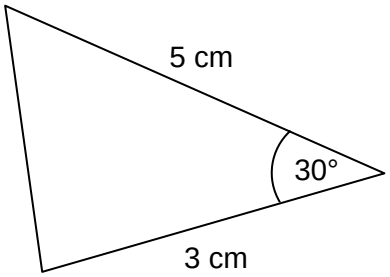

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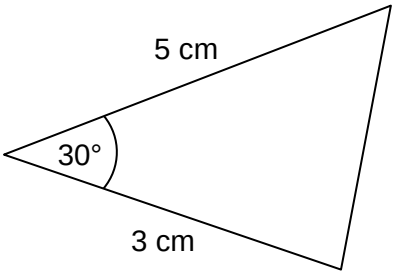

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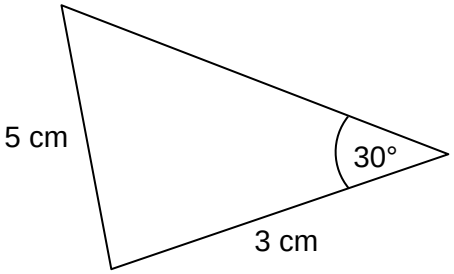


10 (a) Which **two** triangles are congruent?

Circle your answers.

[1 mark]

A B C D

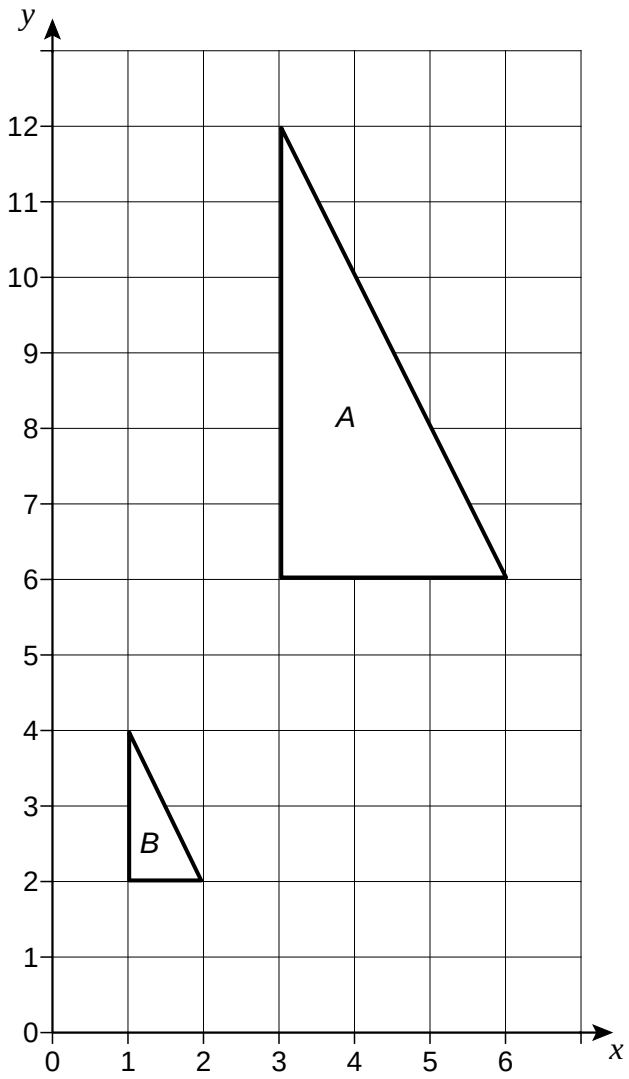
10 (b) Circle the reason for your answer to part (a).

[1 mark]

SSS ASA SAS RHS

11 Describe fully the **single** transformation that maps triangle A to triangle B.

[3 marks]



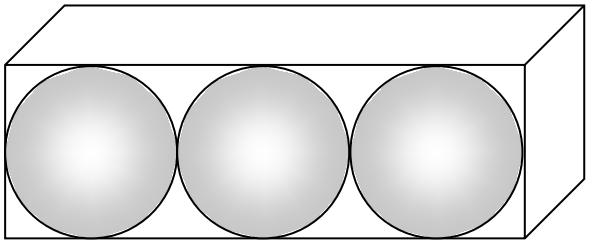
12 Volume of a sphere $= \frac{4}{3}\pi r^3$ where r is the radius.

12 (a) Work out the volume of a sphere of radius 8 cm

[2 marks]

Answer _____ cm^3

12 (b) Three spheres of radius 8 cm are packed tightly into a cuboid as shown.

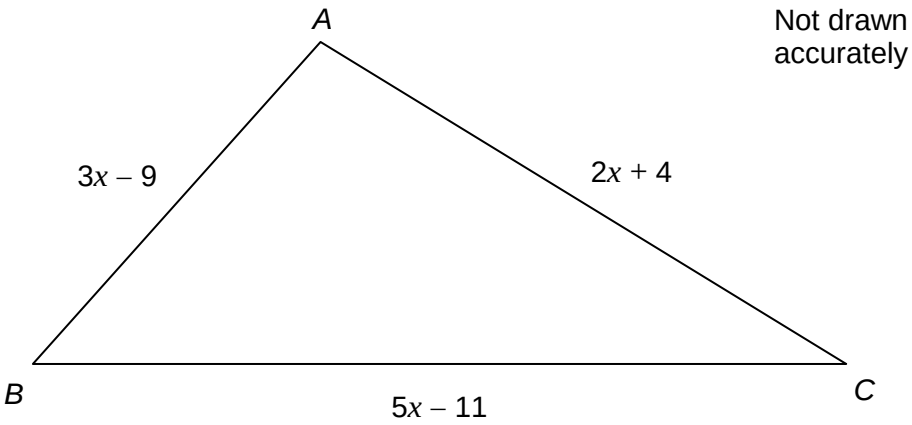


Work out the volume of the cuboid.

[4 marks]

Answer _____ cm^3

13 In this question all lengths are in centimetres.



Given $AB : BC = 1 : 2$

show that $AC : BC = 3 : 4$

[5 marks]

14 A menu has a choice of 3 starters, 5 main courses and 4 desserts.

How many different choices of a 3-course meal are possible?

Circle your answer.

[1 mark]

12 23 60 972

15 A triangle has vertices at A (2, 1), B (3, 4) and C (6, 1)

The triangle is reflected.

Points A and C do not move.

Circle the equation of the line of reflection.

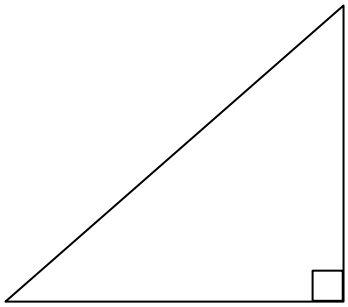
[1 mark]

$y = x$ $x = 2$ $y = 1$ $x = 4$

Turn over for the next question

16 The area of a **right-angled, isosceles** triangle is 4 cm^2

Not drawn accurately



Work out the perimeter of the triangle in centimetres.

Give your answer in the form $a + b\sqrt{c}$, where a, b and c are integers.

[4 marks]

Answer _____ cm

17 On 1st January 2012 Beth invested some money in a bank account.

The account pays 2.5% compound interest per year.

On 1st January 2013 Beth withdrew £1000 from the account.

On 1st January 2014 she had £17 466 in the account.

Work out how much money Beth originally invested in the account.

[4 marks]

Answer £ _____

Turn over for the next question

18 The probability that Gina goes to the gym on Saturday is 0.9

The probability that Dave goes to the gym on Saturday is 0.6

These probabilities are **independent**.

18 (a) Calculate the probability that **both** Gina and Dave go to the gym on Saturday.

[1 mark]

Answer _____

18 (b) If Gina goes to the gym on Saturday the probability that she goes on Sunday is 0.2

If Gina does **not** go to the gym on Saturday the probability that she goes on Sunday is 0.7

Calculate the probability that Gina goes to the gym on exactly **one** of the two days.

[4 marks]

Answer _____

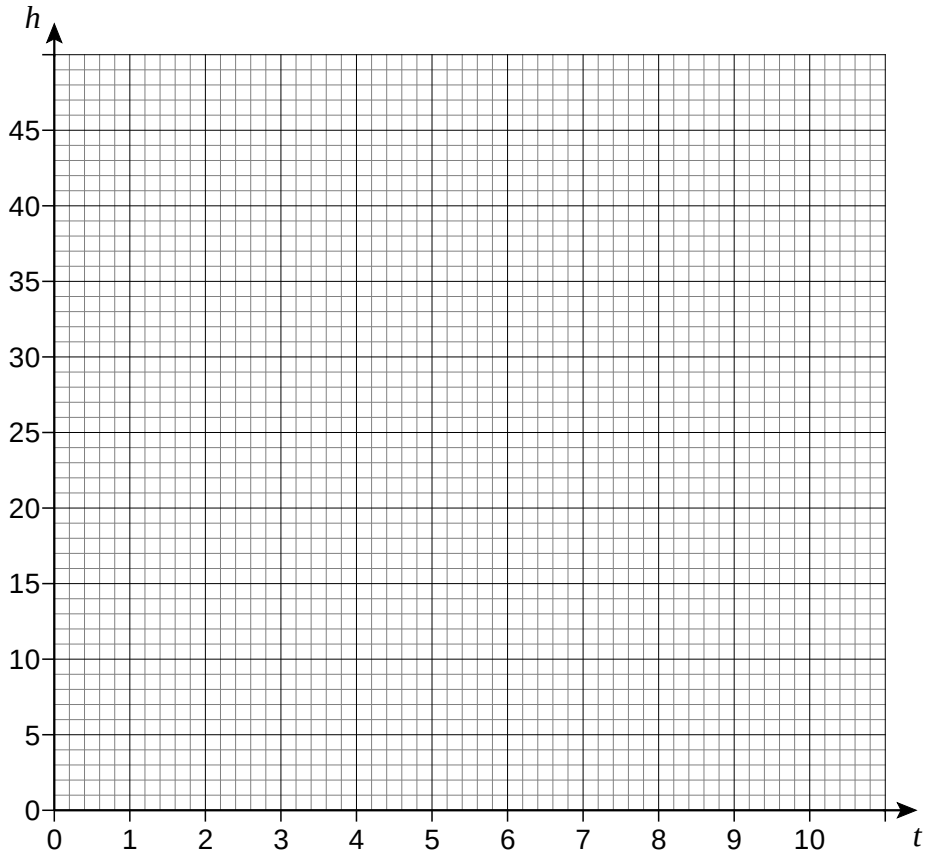
19 The height, h metres, of a particle at time, t seconds, is given by the function

$h = 0$ $\quad 0 \leqslant t < 2$

$h = (14 - t)(t - 2)$ $\quad 2 \leqslant t \leqslant 10$

19 (a) Draw a graph to show the height of the particle in the first 10 seconds.

[3 marks]



19 (b) By joining the points on the graph where $t = 3$ and $t = 7$ with a straight line, work out the average rate of change of height between 3 and 7 seconds.

[2 marks]

Answer _____ m/s

20 In this question use

1 pound = 0.4536 kilograms

1 inch = 2.54 centimetres

The pressure of a basketball is 7.5 pounds per square inch.

Work out this pressure in grams per square centimetre.

[4 marks]

Answer _____ g/cm^2

21 The speed of 50 vehicles was measured travelling along a road.

Speed, s (mph)	Number of cars
$0 < s \leqslant 40$	2
$40 < s \leqslant 60$	11
$60 < s \leqslant 75$	24
$75 < s \leqslant 90$	9
$90 < s$	4

21 (a) Every driver travelling at more than 70 mph is fined £60

On average, 8400 drivers use the road each day.

Estimate the total amount of money raised from fines on the road each day.

[3 marks]

Answer £ _____

21 (b) Mia says,

"4% of vehicles on the road travel at 40 mph or less."

Explain why she might be wrong.

[1 mark]

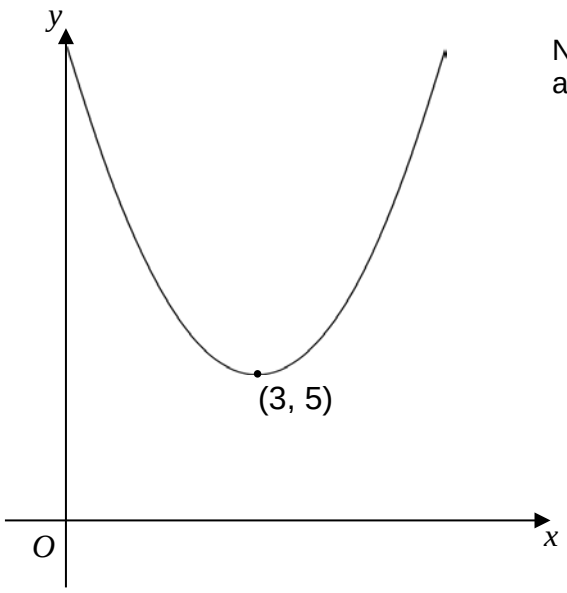
22 (a) Write $x^2 - 10x + 29$ in the form $(x - a)^2 + b$

[2 marks]

Answer _____

22 (b) A sketch of $y = x^2 + cx + d$ is shown.

The turning point is (3, 5)



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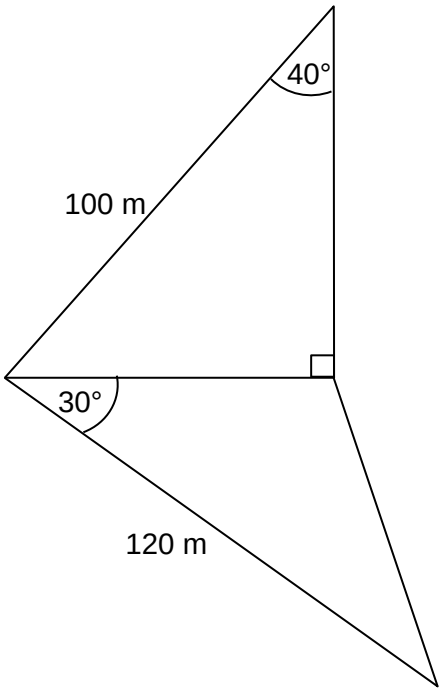
Work out the values of c and d.

[3 marks]

c = _____ d = _____

23 Two triangular lawns are shown.

Wire fencing is needed for all **five** sides.



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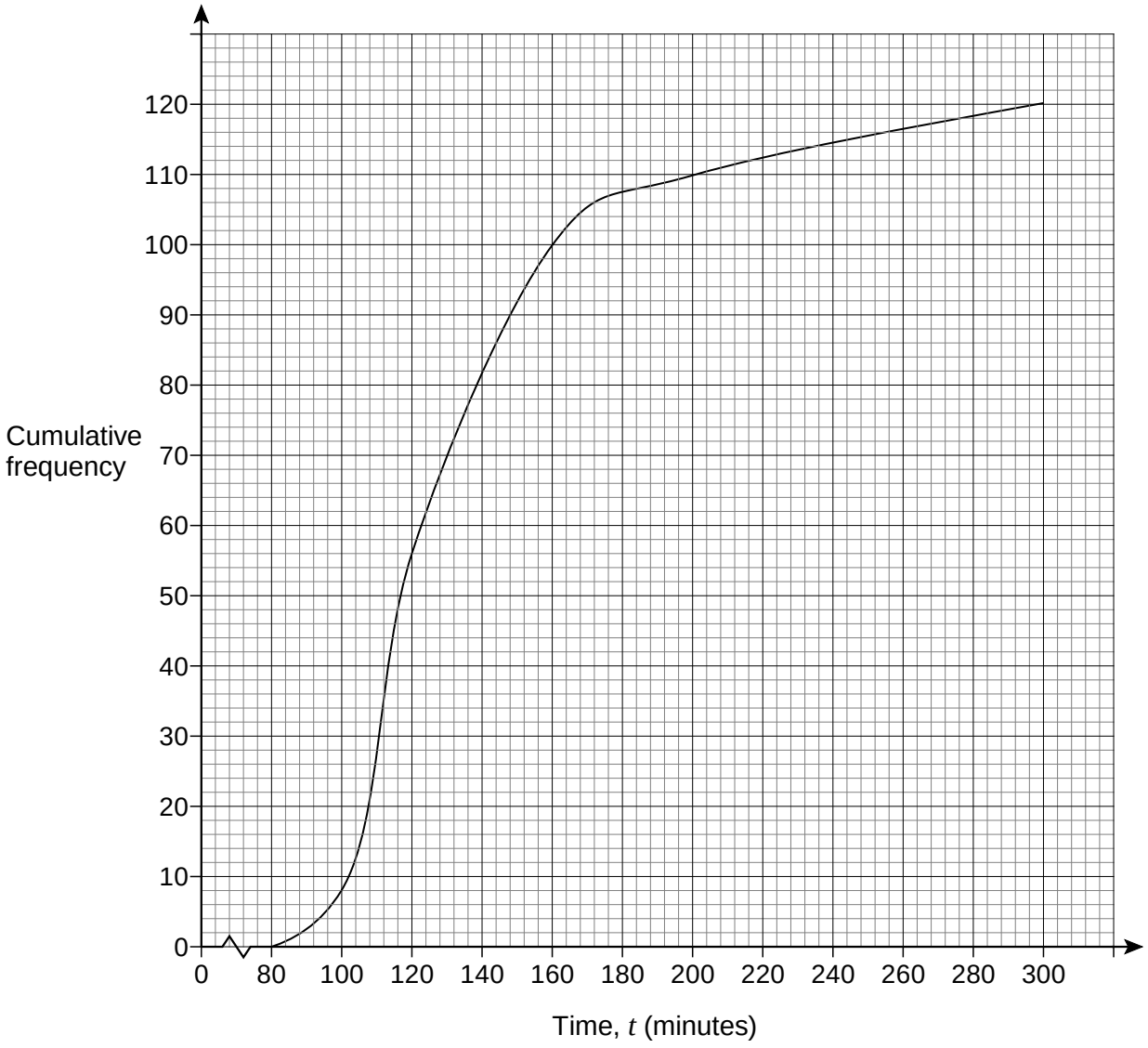
Wire fencing is sold in 50-metre rolls.

Work out the number of rolls needed.

[6 marks]

Answer _____

24 The cumulative frequency diagram shows the times taken by runners to complete a half-marathon.



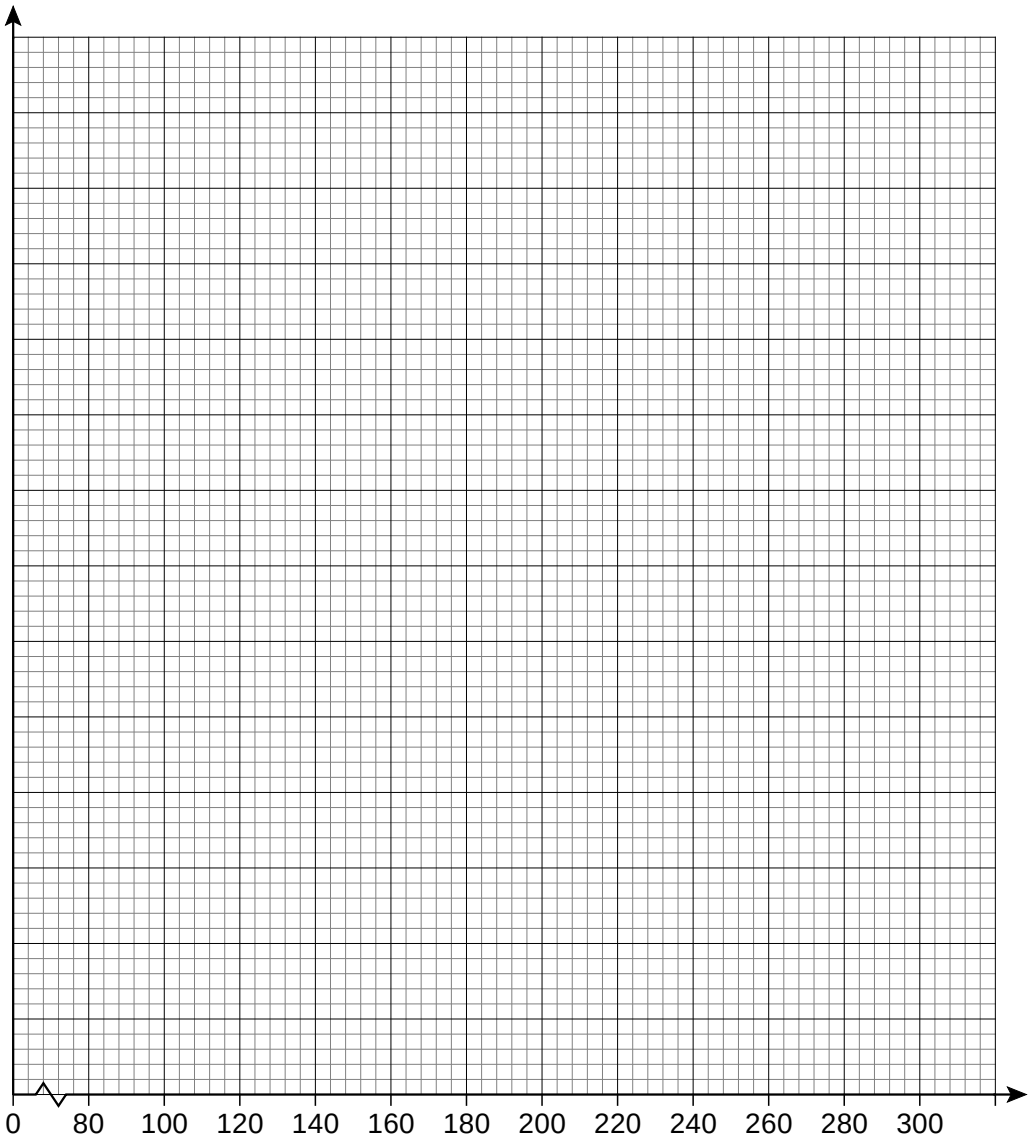
On the grid opposite, draw a histogram to represent the data.

[6 marks]

Use this table to help you.

Time, *t* (minutes)	Cumulative frequency
$t < 100$	
$t < 120$	
$t < 160$	
$t < 200$	
$t < 300$	

Time, *t* (minutes)	Frequency	Class width	Frequency density
$80 \leqslant t < 100$			
$100 \leqslant t < 120$			
$120 \leqslant t < 160$			
$160 \leqslant t < 200$			
$200 \leqslant t < 300$			



END OF QUESTIONS

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