GCSE Grade 7

Maths Booklet 4

Paper 3H
Calculator

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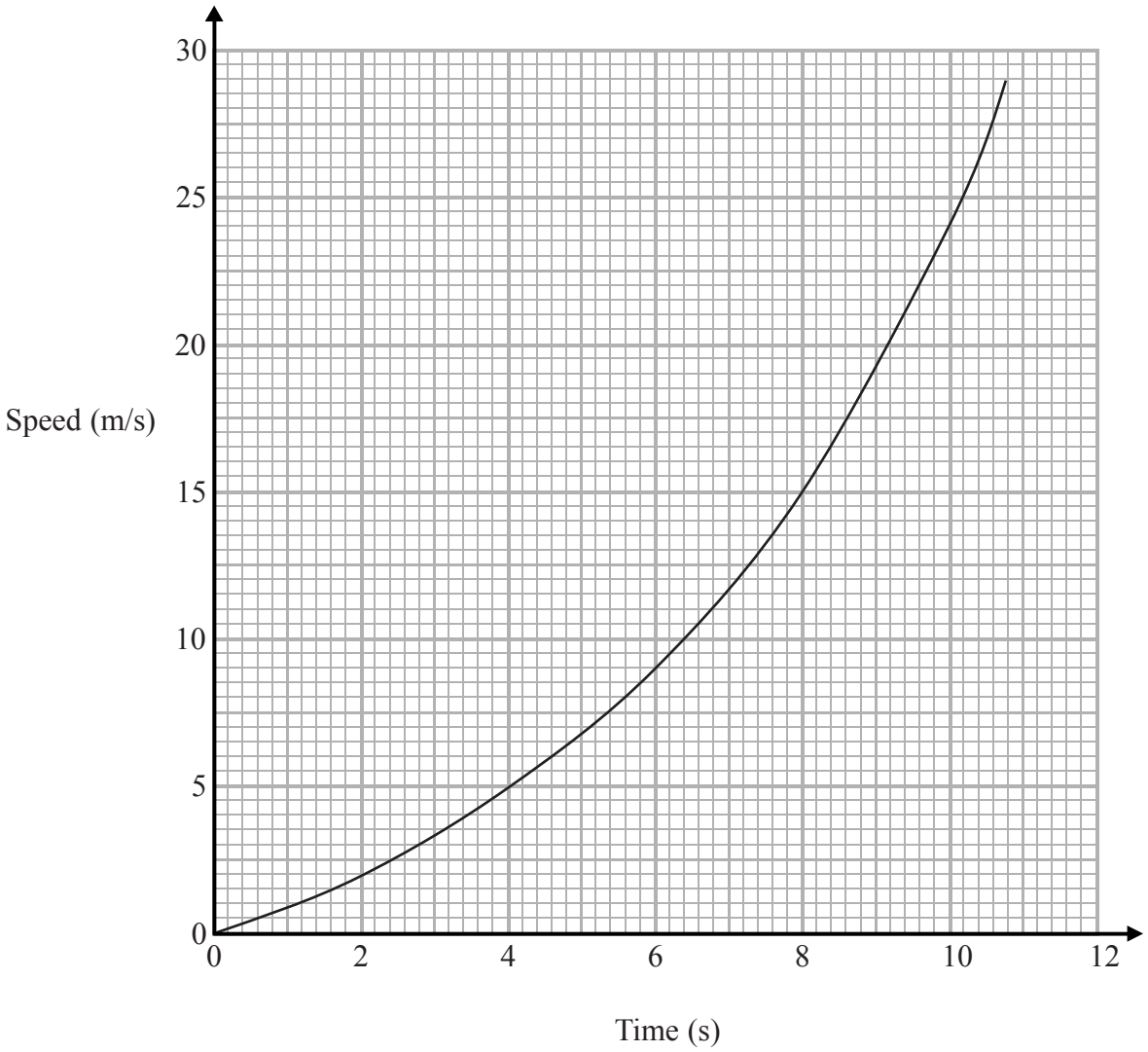
1 The product of two consecutive positive integers is added to the larger of the two integers.

Prove that the result is always a square number.

(Total for Question 1 is 3 marks)

2 Here is a speed-time graph for a car.



(a) Work out an estimate for the distance the car travelled in the first 10 seconds.
Use 5 strips of equal width.

.....m

(3)

(b) Is your answer to (a) an underestimate or an overestimate of the actual distance?
Give a reason for your answer.

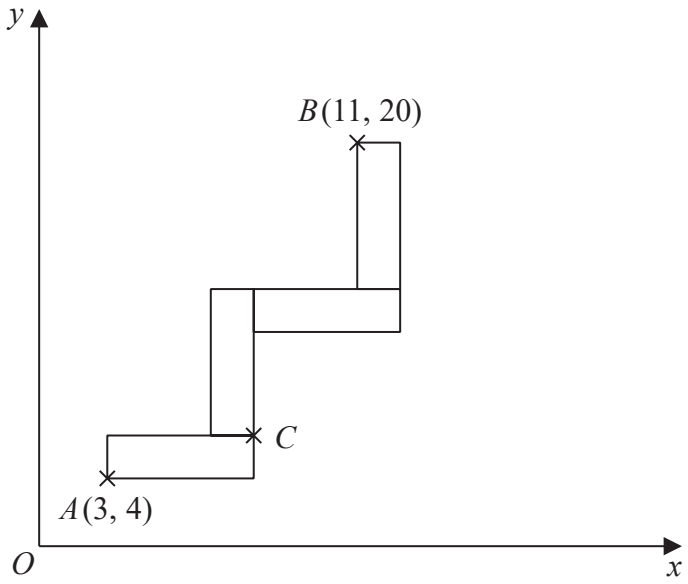
.....

.....

(1)

(Total for Question 2 is 4 marks)

3 A pattern is made from four identical rectangles.
The sides of the rectangles are parallel to the axes.



Point A has coordinates (3, 4)
Point B has coordinates (11, 20)
Point C is marked on the diagram.

Work out the coordinates of C.
You must show all your working.

(..... , ...)

(Total for Question 3 is 5 marks)

4 Olivia and Jessica have in total half as many sweets as Fran and Gary have in total.

Fran and Gary share their sweets in the ratio 2 : 3
Olivia and Jessica share their sweets in the ratio 9 : 1

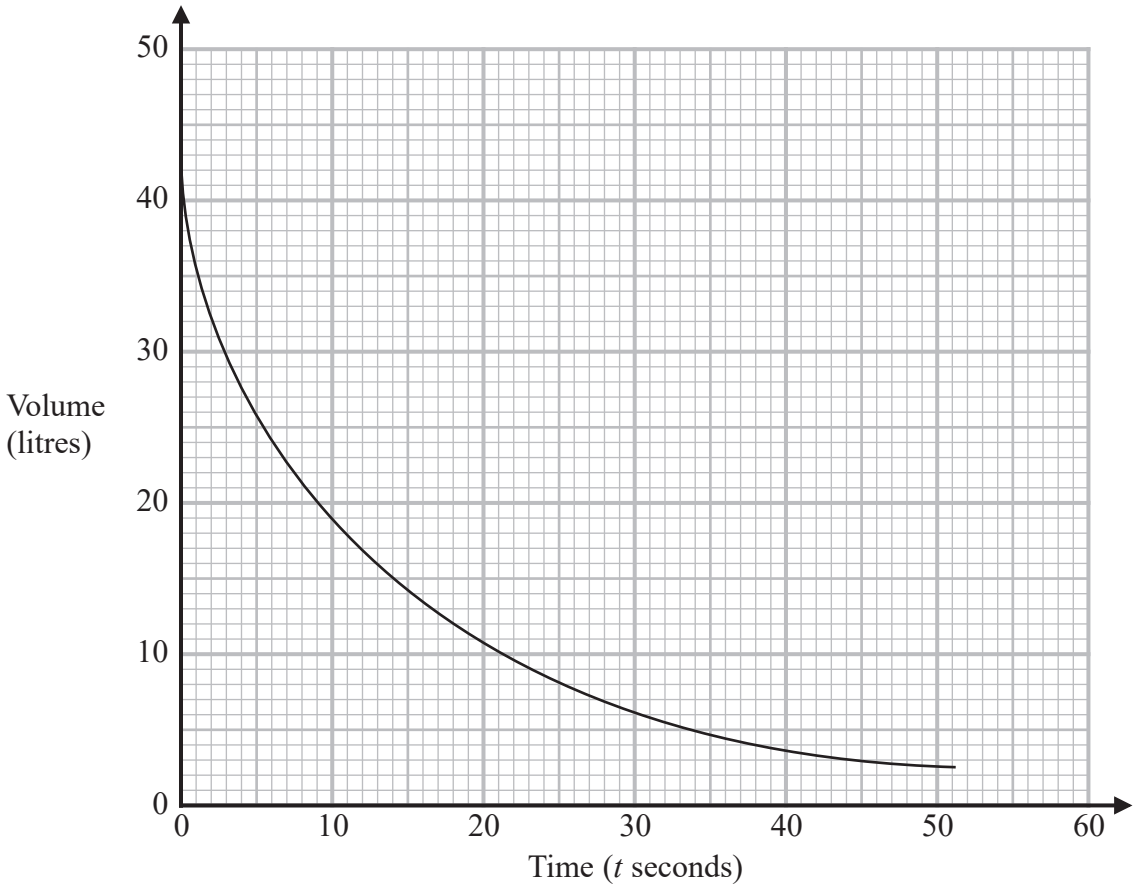
Fran got w sweets.
Gary got x sweets.
Olivia got y sweets.
Jessica got z sweets.

Find, in its simplest form, $w : x : y : z$

.....

(Total for Question 4 is 4 marks)

5 The graph gives the volume of water, in litres, in a container at time t seconds after the water started to flow out of the container.



Using the graph, work out an estimate for the rate at which the water is flowing out of the container when $t = 12$
You must show your working.

..... litres per second

(Total for Question 5 is 3 marks)

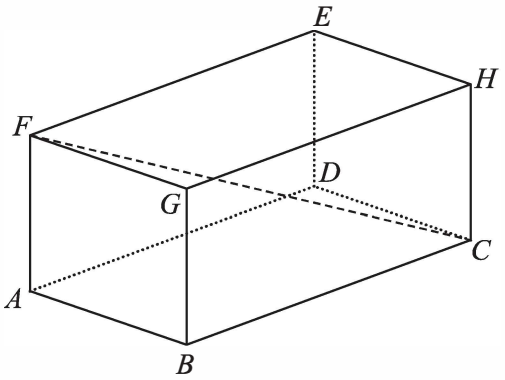
6 The curve **C** has equation $y = x^2 + 3x - 3$

The line **L** has equation $y - 5x + 4 = 0$

Show, algebraically, that **C** and **L** have exactly one point in common.

(Total for Question 6 is 4 marks)

7 The diagram shows a cuboid *ABCDEFGH*.



AB = 7 cm, *AF* = 5 cm and *FC* = 15 cm.

Calculate the volume of the cuboid.
Give your answer correct to 3 significant figures.

..... cm^3

(Total for Question 7 is 4 marks)

8 There are 14 boys and 12 girls in a class.

Work out the total number of ways that 1 boy and 1 girl can be chosen from the class.

.....

(Total for Question 8 is 2 marks)

9 Write

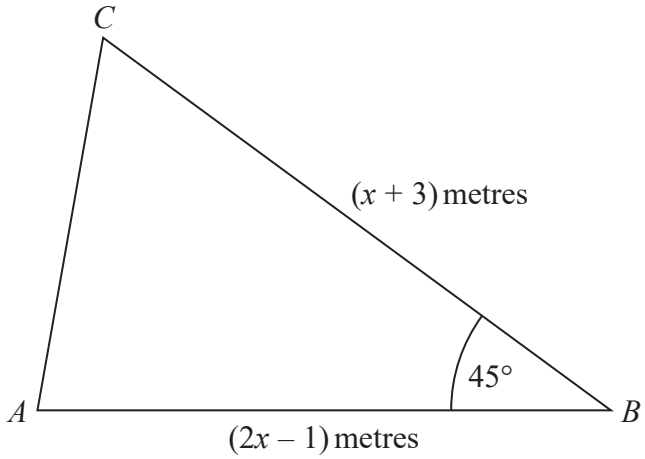
$$4 - \left[(x + 3) \div \frac{x^2 + 5x + 6}{x - 2} \right]$$

as a single fraction in its simplest form.
You must show your working.

.....

(Total for Question 9 is 4 marks)

10



The area of triangle ABC is $6\sqrt{2}$ m^2.

Calculate the value of x.
Give your answer correct to 3 significant figures.

.....

(Total for Question 10 is 5 marks)