



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

**1** Circle the calculation that increases 400 by 7% **[1 mark]**

$400 \times 0.07$

$400 \times 0.7$

$400 \times 1.07$

$400 \times 1.7$

**2** Simplify  $3^4 \times 3^4$   
Circle the answer. **[1 mark]**

$3^8$

$9^8$

$3^{16}$

$9^{16}$

**3** Circle the area that is the same as  $5.5 \text{ m}^2$  **[1 mark]**

$550 \text{ cm}^2$

$5\,500 \text{ cm}^2$

$55\,000 \text{ cm}^2$

$5\,500\,000 \text{ cm}^2$

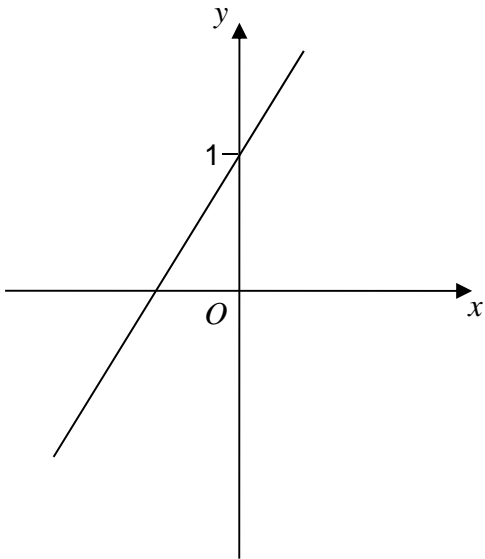
4 One of these graphs is a sketch of  $y = 1 - 2x$

Which one?

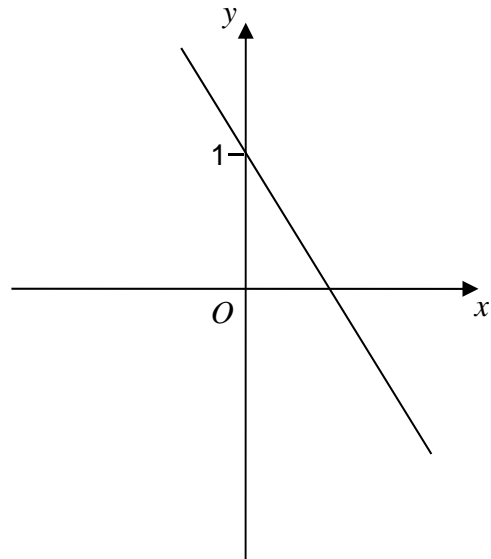
Circle the correct letter.

[1 mark]

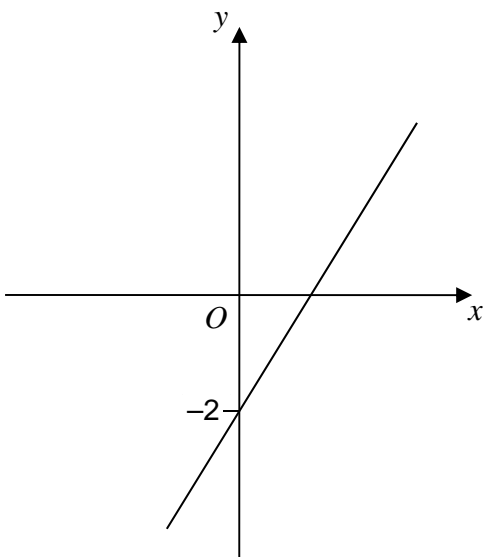
**A**



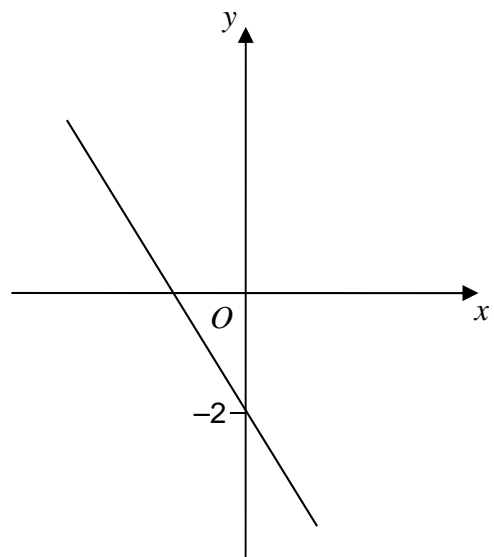
**B**



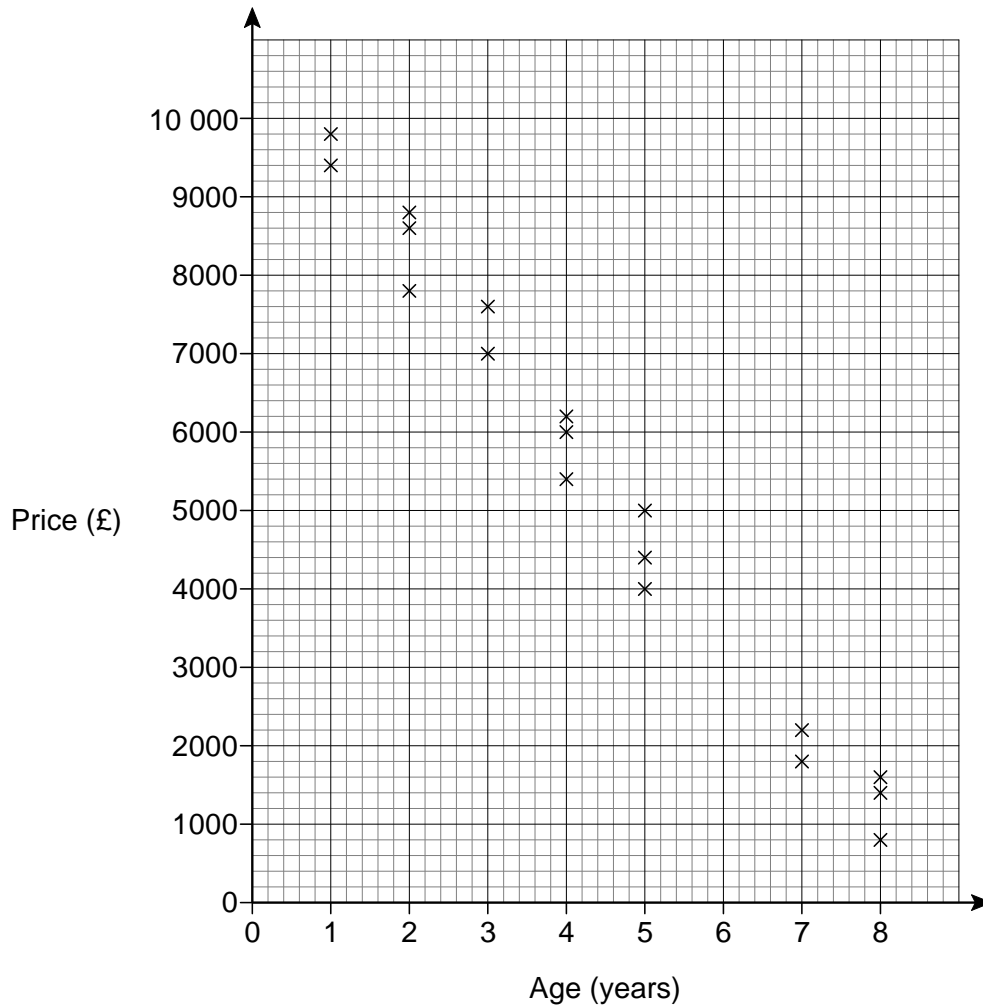
**C**



**D**



- 5 The scatter graph shows the age and the price of 18 cars.  
The cars are all the same make and model.



Use a line of best fit to estimate the price of a 6-year old car.

[2 marks]

Answer £ \_\_\_\_\_

- 6 Kelly is trying to work out the two values of  $w$  for which  $3w - w^3 = 2$   
Her values are 1 and  $-1$

Are her values correct?

You **must** show your working.

[2 marks]

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- 7 Work out  $2\frac{3}{4} \times 1\frac{5}{7}$

Give your answer as a mixed number in its simplest form.

[3 marks]

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Answer \_\_\_\_\_

8 Solve  $5x - 2 > 3x + 11$

[2 marks]

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Answer \_\_\_\_\_

9 The  $n$ th term of a sequence is  $2n + 1$   
The  $n$ th term of a different sequence is  $3n - 1$

Work out the **three** numbers that are

in both sequences

and

between 20 and 40

[3 marks]

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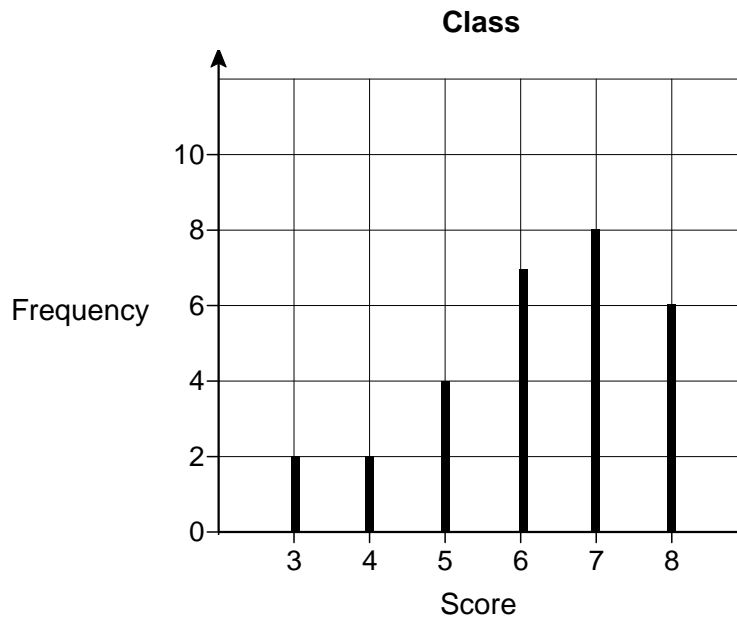
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Answer \_\_\_\_\_, \_\_\_\_\_, \_\_\_\_\_



- 11 Students in a class took a spelling test.  
The diagram shows information about the scores.



Lucy is one of the 29 students in the class.  
Her score was the same as the **median** score for her class.

Work out her score.

[2 marks]

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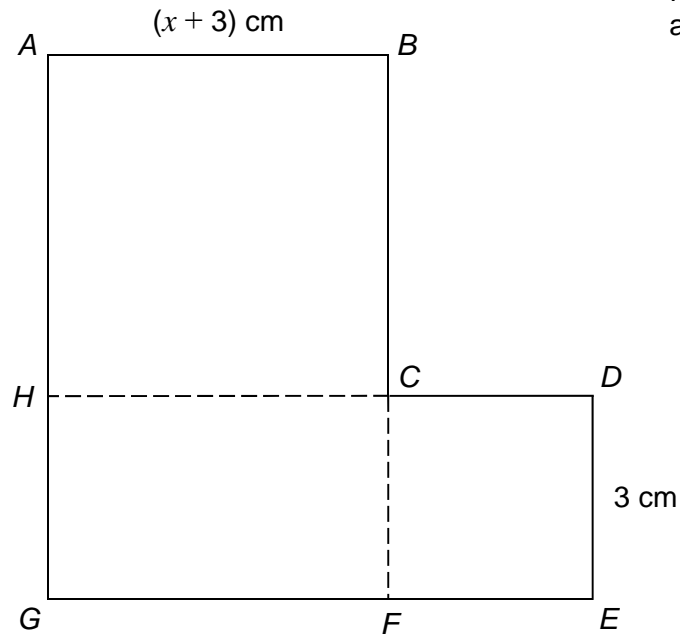
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Answer \_\_\_\_\_



- 12 *ABCH* is a square.  
*HCFG* is a rectangle.  
*CDEF* is a square.

They are joined to make an L-shape.



Not drawn  
accurately

Show that the total area of the L-shape, in  $\text{cm}^2$ , is  $x^2 + 9x + 27$

[4 marks]

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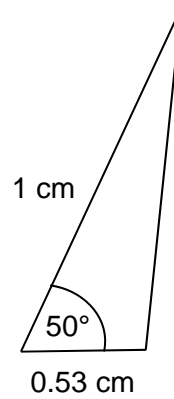
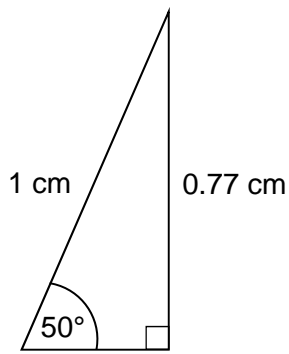


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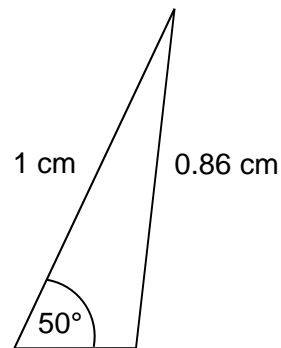
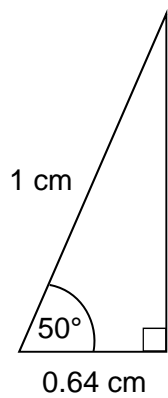


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13 Here are sketches of four triangles.



Not drawn accurately



In each triangle

the longest side is **exactly** 1 cm

the other length is given to 2 decimal places.

13 (a) Circle the value of  $\cos 50^\circ$  to 2 decimal places.

[1 mark]

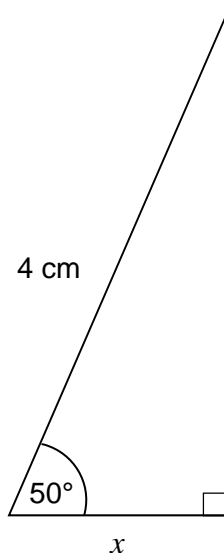
0.77

0.53

0.64

0.86

- 13 (b)** Work out the value of  $x$ .  
Give your answer to 1 decimal place.



Not drawn  
accurately

[2 marks]

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Answer \_\_\_\_\_ cm

**Turn over for the next question**

- 14** A prime number between 300 and 450 is chosen at random.  
The table shows the probability that the number lies in different ranges.

Prime number, $n$	Probability
$300 \leq n < 330$	0.16
$330 \leq n < 360$	0.24
$360 \leq n < 390$	$x$
$390 \leq n < 420$	0.16
$420 \leq n < 450$	0.24

- 14 (a)** Work out the value of  $x$ .

**[2 marks]**

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Answer \_\_\_\_\_

- 14 (b)** Work out the probability that the prime number is greater than 390

**[1 mark]**

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Answer \_\_\_\_\_

**14 (c)** There are four prime numbers between 300 and 330

How many prime numbers are there between 300 and 450?

**[2 marks]**

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Answer \_\_\_\_\_

**15**  $a \times 10^4 + a \times 10^2 = 24\,240$  where  $a$  is a number.

Work out  $a \times 10^4 - a \times 10^2$

Give your answer in standard form.

**[2 marks]**

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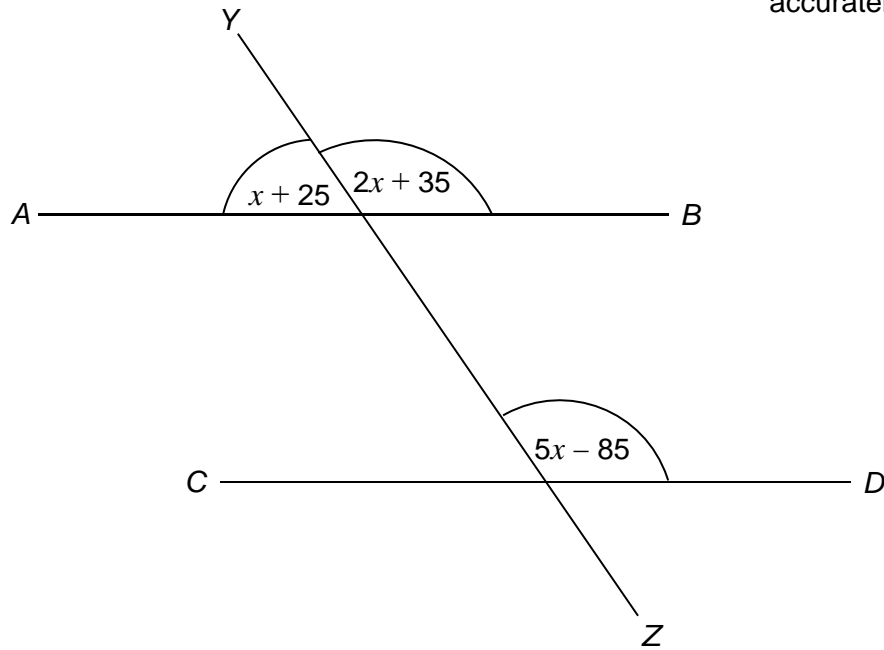
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Answer \_\_\_\_\_

- 16**  $AB$ ,  $CD$  and  $YZ$  are straight lines.  
All angles are in degrees.

Not drawn  
accurately



Show that  $AB$  is parallel to  $CD$ .

[4 marks]

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**17** To complete a task in 15 days a company needs  
4 people each working for 8 hours per day.

The company decides to have  
5 people each working for 6 hours per day.

Assume that each person works at the same rate.

**17 (a)** How many days will the task take to complete?  
You **must** show your working.

**[3 marks]**

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Answer \_\_\_\_\_

**17 (b)** Comment on how the assumption affects your answer to part (a).

**[1 mark]**

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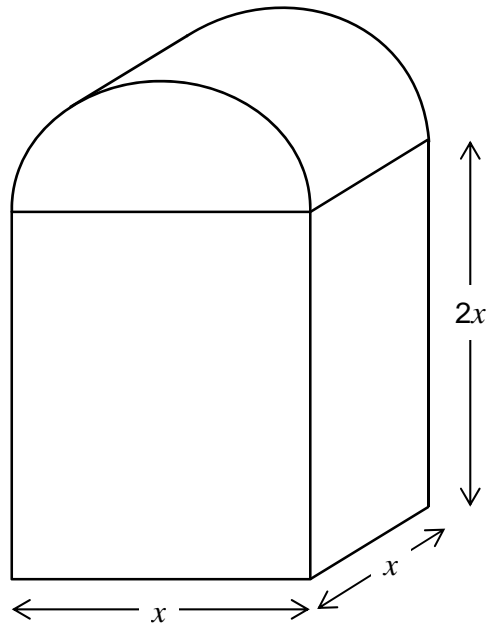


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18 In this question all dimensions are in centimetres.

A solid has uniform cross section.

The cross section is a rectangle and a semicircle joined together.



Work out an expression, in  $\text{cm}^3$ , for the **total** volume of the solid.

Write your expression in the form  $ax^3 + \frac{1}{b}\pi x^3$  where  $a$  and  $b$  are integers.

**[4 marks]**

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Answer \_\_\_\_\_  $\text{cm}^3$



- 19** Show that  $12 \cos 30^\circ - 2 \tan 60^\circ$  can be written in the form  $\sqrt{k}$  where  $k$  is an integer.

**[3 marks]**

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**Turn over for the next question**

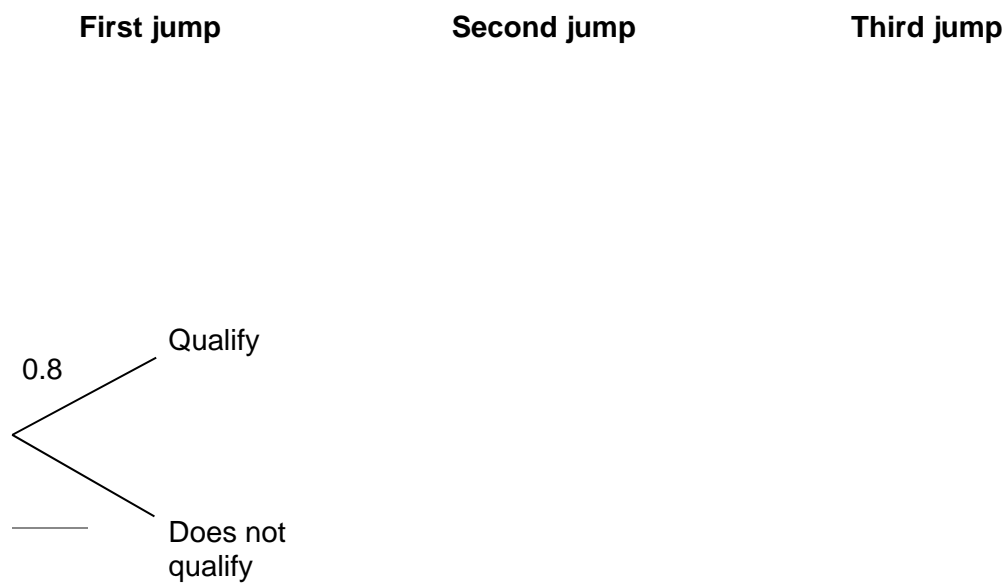
**20** On Friday, Greg takes part in a long jump competition.  
He has to jump at least 7.5 metres to qualify for the final on Saturday.

- He has up to three jumps to qualify.
- If he jumps at least 7.5 metres he does **not** jump again on Friday.

Each time Greg jumps, the probability he jumps at least 7.5 metres is 0.8  
Assume each jump is independent.

**20 (a)** Complete the tree diagram.

**[2 marks]**



**20 (b)** Work out the probability that he does **not** need the third jump to qualify.

**[2 marks]**

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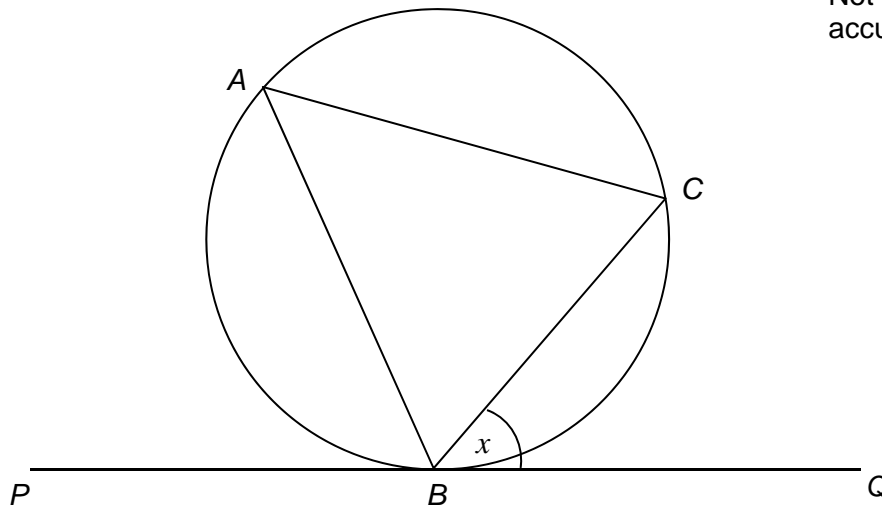
Answer \_\_\_\_\_

21

$A$ ,  $B$  and  $C$  are points on a circle.

- $BC$  bisects angle  $ABQ$ .
- $PBQ$  is a tangent to the circle.

Not drawn  
accurately



Angle  $CBQ = x$

Prove that  $AC = BC$

[3 marks]

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Turn over for the next question

**22** Steph is solving a problem.

Cube A has a surface area of  $150 \text{ cm}^2$

Cube B has sides half the length of cube A

What is the volume of cube B?

To solve this problem, Steph decides to

- halve the surface area
- calculate the square root of the answer
- then divide by 6
- then cube this answer to work out the volume.

Evaluate Steph's method.

**[2 marks]**

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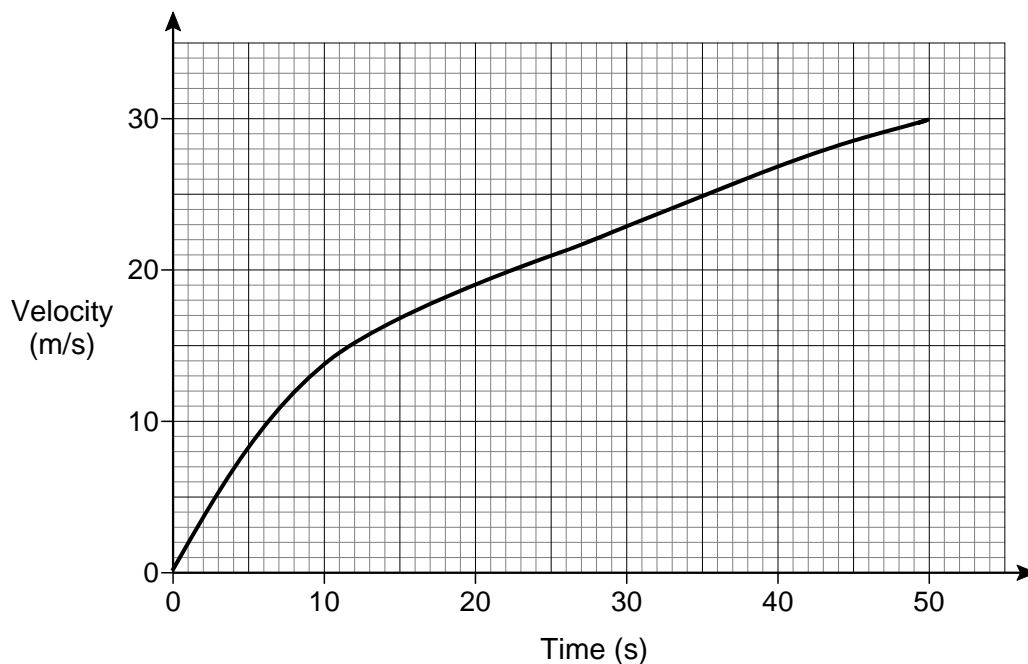
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24 Here is the velocity-time graph of a car for 50 seconds.



24 (a) Work out the average acceleration during the 50 seconds.

Give the units of your answer.

[2 marks]

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Answer \_\_\_\_\_

24 (b) Estimate the time during the 50 seconds when

the instantaneous acceleration = the average acceleration

You **must** show your working on the graph.

[2 marks]

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Answer \_\_\_\_\_ seconds

25

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

$$g(x) = cx + 5$$

$$fg(x) = 6x + d$$

$c$  and  $d$  are constants.

Work out the value of  $d$ .

[3 marks]

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Answer \_\_\_\_\_

**Turn over for the next question**

26 Rationalise the denominator and simplify  $\frac{10}{3\sqrt{5}}$

[2 marks]

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Answer \_\_\_\_\_

27 Convert  $0.1\dot{7}\dot{2}$  to a fraction in its lowest terms.

[3 marks]

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Answer \_\_\_\_\_





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