



# **GCSE MATHEMATICS**

S21-C300

## **Non-Calculator Assessment Resource M**

Higher Tier

## Formula list

### *Area and volume formulae*

Where  $r$  is the radius of the sphere or cone,  $l$  is the slant height of a cone and  $h$  is the perpendicular height of a cone:

$$\text{Curved surface area of a cone} = \pi r l$$

$$\text{Surface area of a sphere} = 4\pi r^2$$

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

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

### *Kinematics formulae*

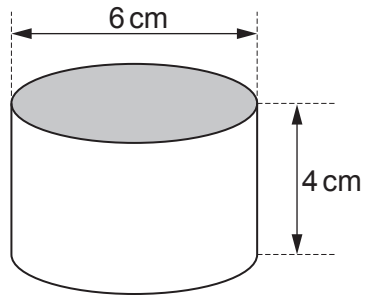
Where  $a$  is constant acceleration,  $u$  is initial velocity,  $v$  is final velocity,  $s$  is displacement from the position when  $t = 0$  and  $t$  is time taken:

$$v = u + at$$

$$s = ut + \frac{1}{2}at^2$$

$$v^2 = u^2 + 2as$$

1. The diagram shows a cylinder.



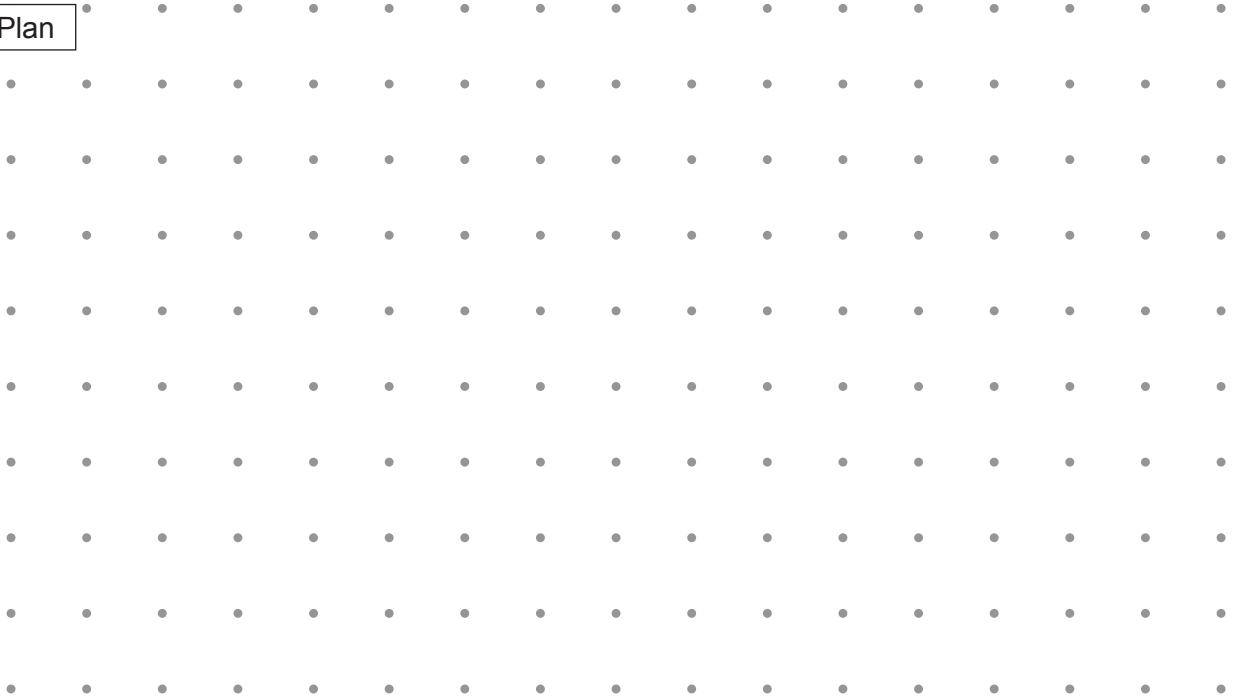
*Diagram not drawn to scale*

On the 1 centimetre grid below, draw accurately:

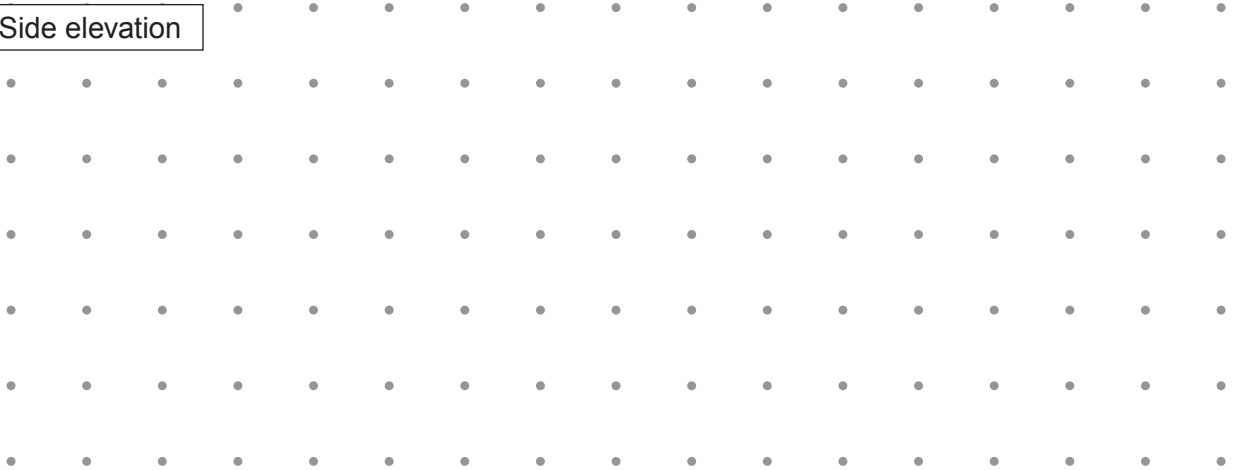
- the plan of the cylinder,
- the side elevation of the cylinder.

[3]

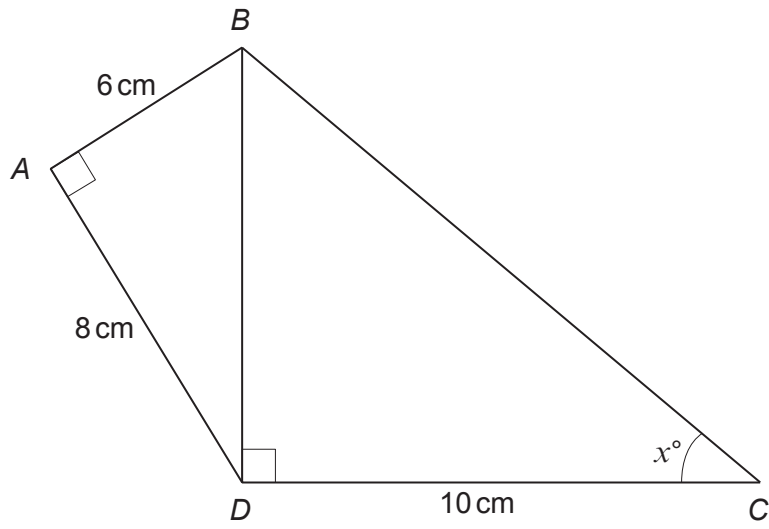
Plan



Side elevation



2.



*Diagram not drawn to scale*

Find the value of  $x$ .  
You must show all your working.

[3]

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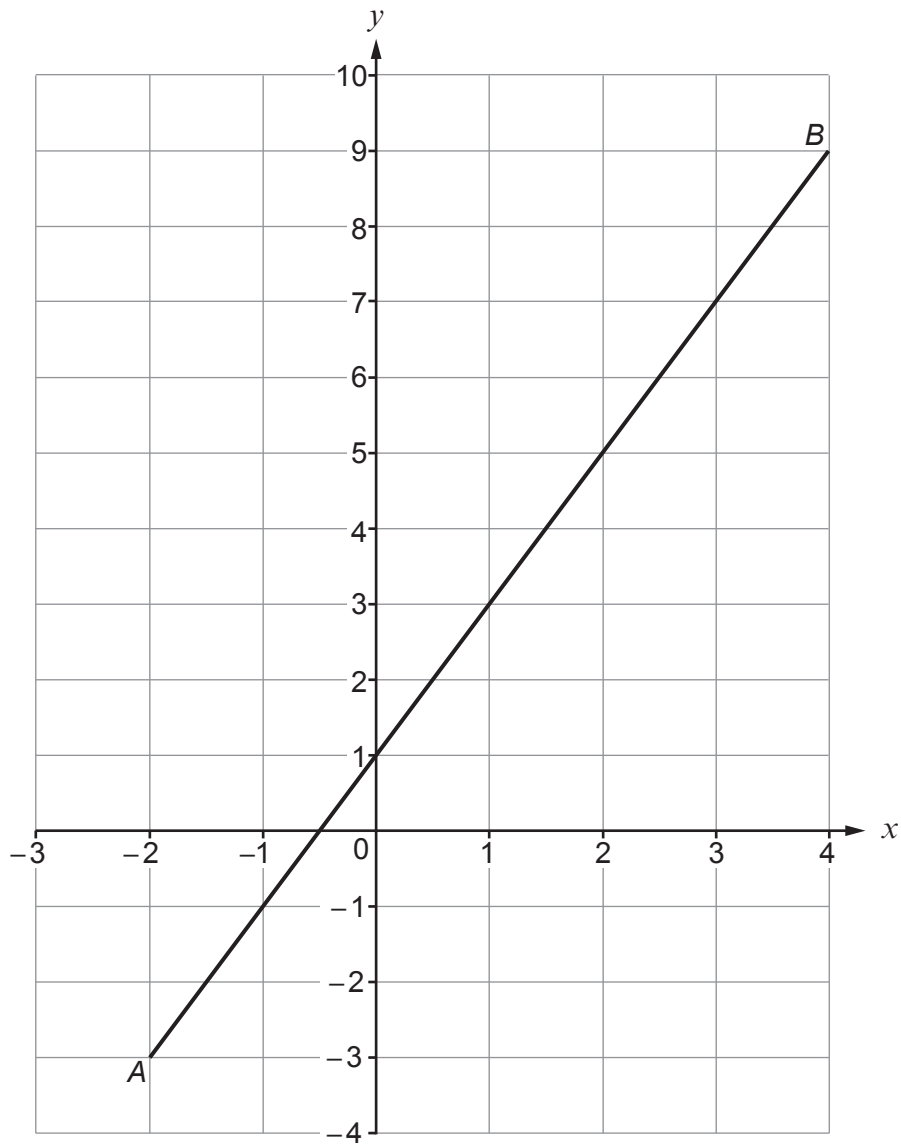
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$x =$  .....





4.



The diagram shows the graph of a straight line,  $AB$ .

- (a) Find the equation of this line.  
Give your answer in the form  $y = mx + c$ .

[3]

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$y =$  .....





5. It is known that  $y$  varies inversely as the cube root of  $x$  and that  $y = 2$  when  $x = 27$ .

(a) Find a formula for  $y$  in terms of  $x$ .

[3]

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(b) Using your answer to part (a), find

(i)  $y$  when  $x = 1000$ ,

[1]

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(ii)  $x$  when  $y = 3$ .

[2]

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6. (a)

$$V_0 = 10000$$

$$V_{n+1} = 0.8 V_n \text{ where } n \geq 0$$

This iterative formula can be used to work out the value  $V_n$  of a particular type of car when it is  $n$  years old.

(i) Show that a car of this type that is 1 year old is worth £8000. [1]

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(ii) Use this formula to find the value of a car of this type that is 3 years old. [3]

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Value is £ .....

(b)



A newly built house is worth £240 000 and is expected to increase in value by 2% each year.

Complete the following iterative formula to show this information. [1]

$$V_0 = \dots\dots\dots$$

$$V_{n+1} = \dots\dots\dots V_n \text{ where } n \geq 0$$

