



GCSE MATHEMATICS

S21-C300

Non-Calculator Assessment Resource A

Foundation 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. (a) Halima makes a shape by joining 5 cubes.

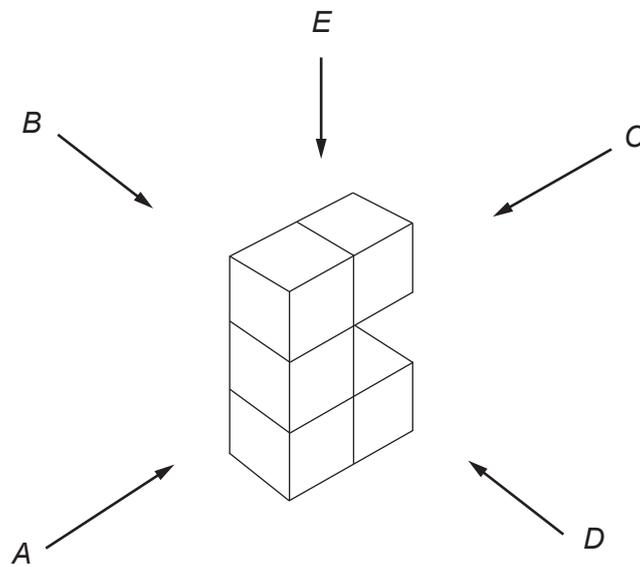
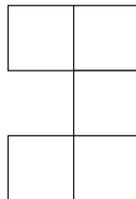


Diagram not drawn to scale

She looks at each of the side elevations, from the positions *A*, *B*, *C* and *D*, and the plan, from *E*.

- (i) Here is what Halima sees from one of her positions.



Which position is this?
Circle your answer.

[1]

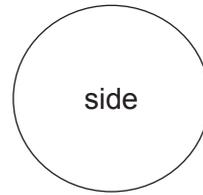
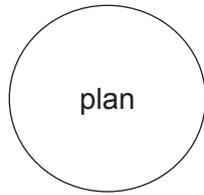
A *B* *C* *D* *E*

- (ii) How many square faces can Halima see from position *C*?
Circle your answer.

[1]

1 2 3 4 5

(b) The diagram shows the plan and side elevation of another 3D shape.



Circle the correct name for the 3D shape shown.

[1]

cylinder

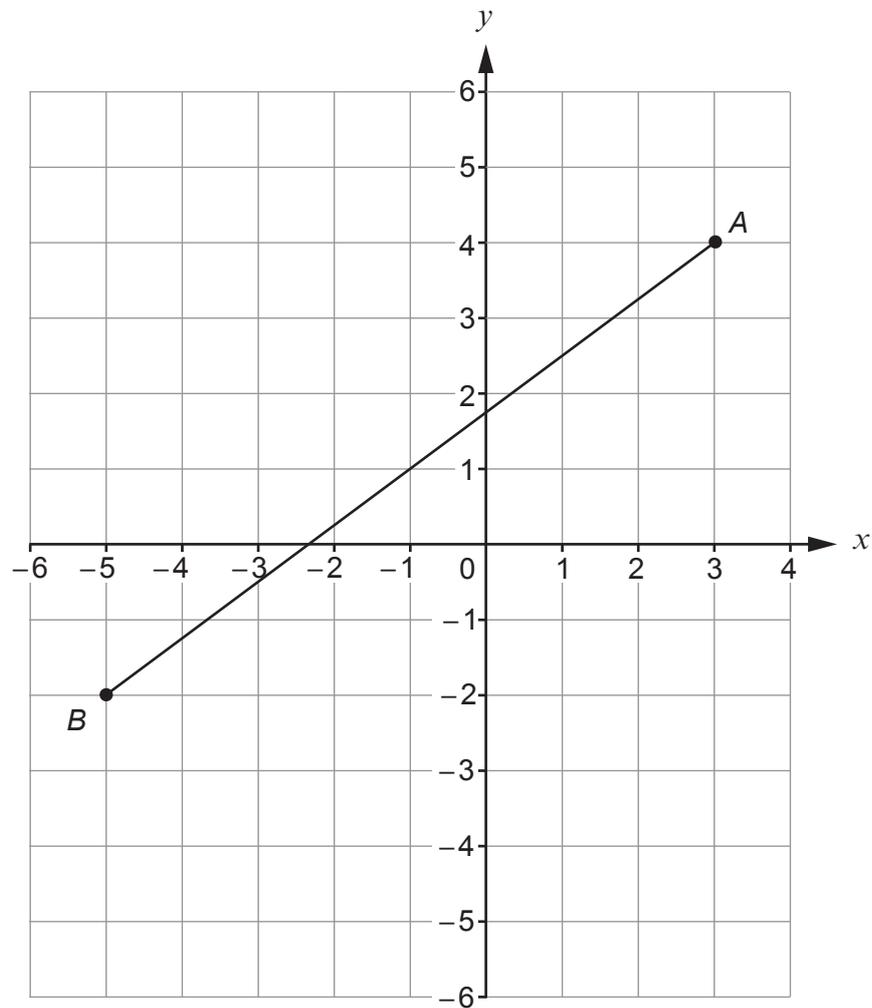
circle

pyramid

cone

sphere

2.



The line AB is drawn on the 1 cm grid above.

(a) (i) Write down the coordinates of A . [1]

A (..... ,)

(ii) The point C is the mid-point of AB .

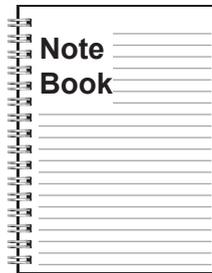
Mark the position of the point C on the grid. [1]

(b) The line BD is parallel to the y -axis.
Triangle ABD is a right-angled triangle.

Mark the position of point D on the grid and write down the length of AD . [2]

Length AD = cm

3. Petra is shopping with 2 of her friends.
- (a) She buys a note book and six **identical** pencils.



The note book costs the same as 2 of the pencils.
Her bill is £16.80.

- (i) How much does a note book cost?

[3]

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- (ii) Petra pays with a £50 note.
She is given £34.20 change.

She tells the shopkeeper,

"You have given me too much change."

Is Petra correct?

Yes No

Show how you decide.

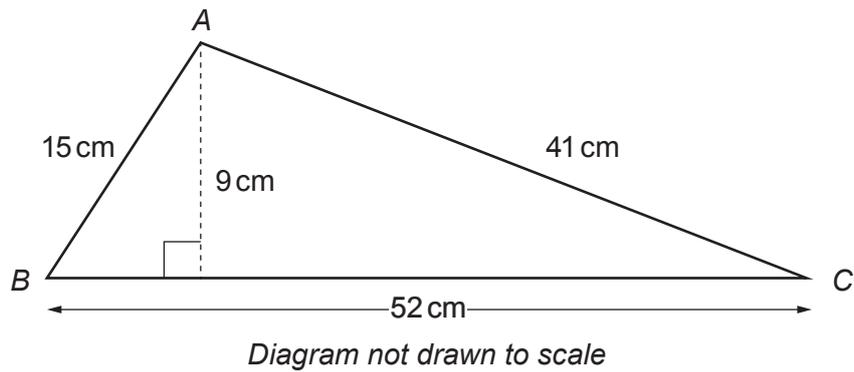
[1]

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4. (a)



Work out the area of triangle ABC.

[2]

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Area ABC = cm²

(b) This shape is made from two rectangles.

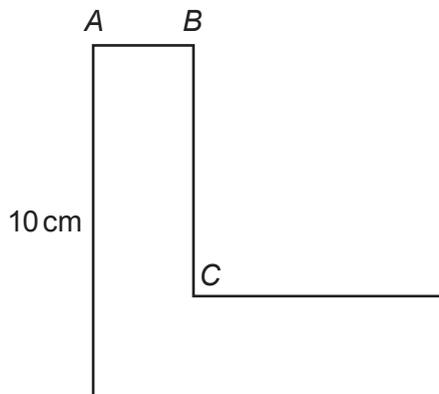


Diagram not drawn to scale

The shape has one line of symmetry.
The perimeter of the shape is 40 cm.
The length of BC is 4 times the length of AB.

Work out the length of BC.

[3]

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BC = cm

5. The diagram shows the position of two points, *A* and *B*.
The scale is 1 cm represents 1 km.



1 cm represents 1 km

- (a) Measure and write down the bearing of *B* from *A*.

[1]

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- (b) Point *C* is 5 km from *A* and 6 km from *B*.
The bearing of *C* from *B* is an acute angle.

Complete the diagram to find the position of point *C*.

[3]

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8. (a) $120 = 2^3 \times 3^k \times 5$

Find the value of k .

[1]

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(b) Write 168 as a product of its prime factors.

[2]

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(c) *LoWatts Ltd* makes light bulbs that are identical in size.

They have regular orders from *Company A* for 120 light bulbs and from *Company B* for 168 light bulbs.

LoWatts Ltd uses one size of box to supply both *Company A* and *Company B*. Each box used contains the same number of light bulbs and is full. The number of boxes used is as few as possible.

How many light bulbs does each box hold?

[3]

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9.

$$\mathbf{p} = \begin{pmatrix} 4 \\ 2 \end{pmatrix} \text{ and } \mathbf{q} = \begin{pmatrix} -3 \\ 2 \end{pmatrix}$$

Work out the column vector $\frac{1}{2}\mathbf{p} - \mathbf{q}$.

[2]

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$$\frac{1}{2}\mathbf{p} - \mathbf{q} = \begin{pmatrix} \\ \end{pmatrix}$$