

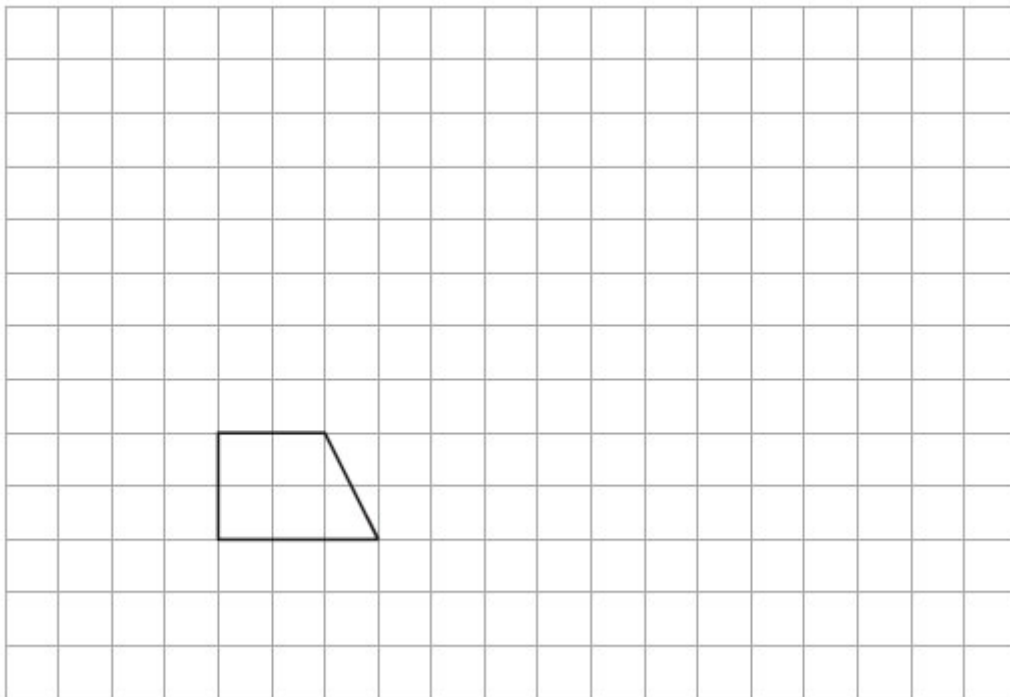
Higher tier unit 8a check in test

Non-calculator

Q1. Shape A is rotated 90° clockwise about the origin to make shape B.
Choose the statement that best describes shape A and shape B.

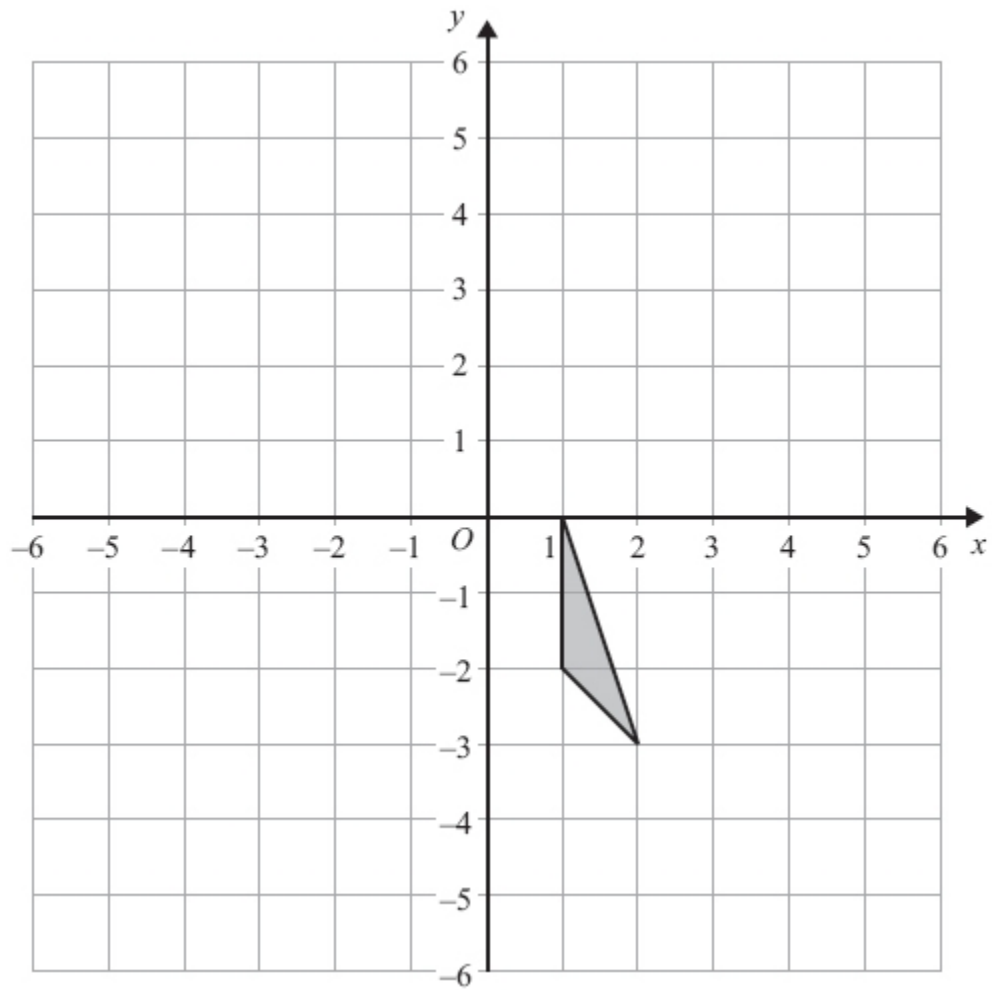
- A Shape A and shape B are the same shape and different sizes
- B Shape A and shape B are the same size but different shapes
- C Shape A and shape B are congruent
- D Shape A and shape B are similar

Q2. Here is a shape drawn on a grid.



On this grid, draw an enlargement of the shape with scale factor 3.

Q3.



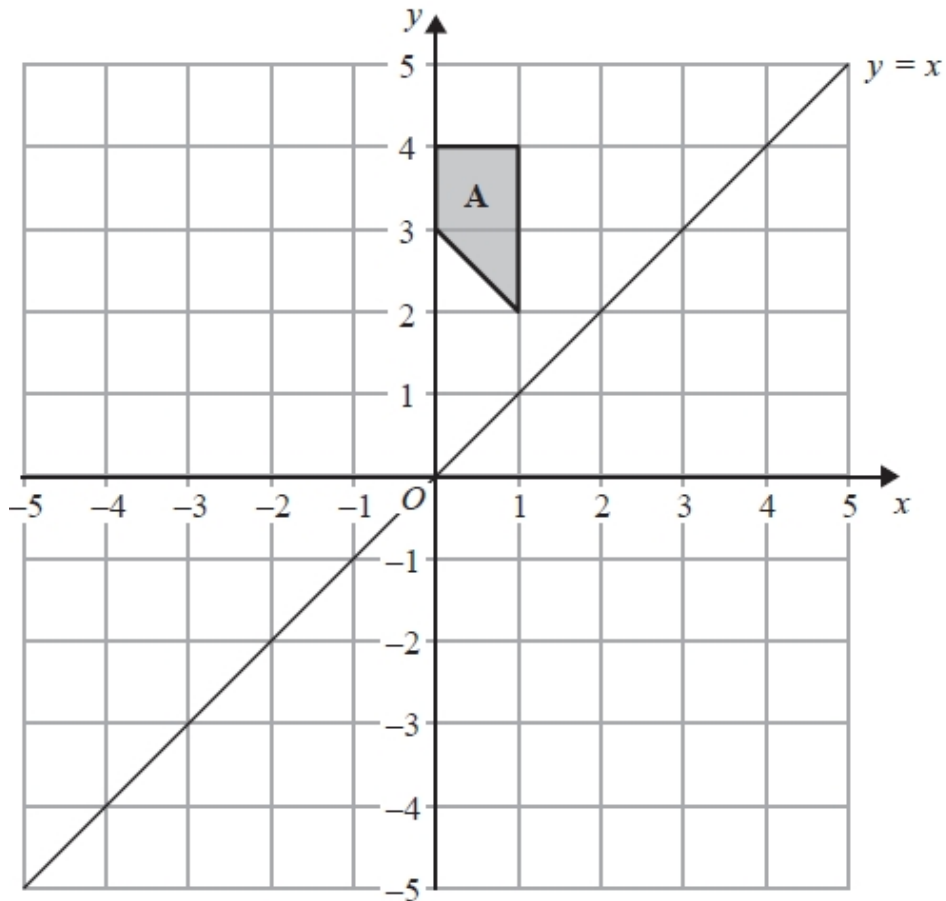
Translate the triangle by $\begin{pmatrix} 3 \\ 2 \end{pmatrix}$.

Q4. Shape A is mapped onto shape B by the translation $\begin{pmatrix} 2 \\ 4 \end{pmatrix}$.

Shape B is then mapped onto shape C by the translation $\begin{pmatrix} 8 \\ 1 \end{pmatrix}$.

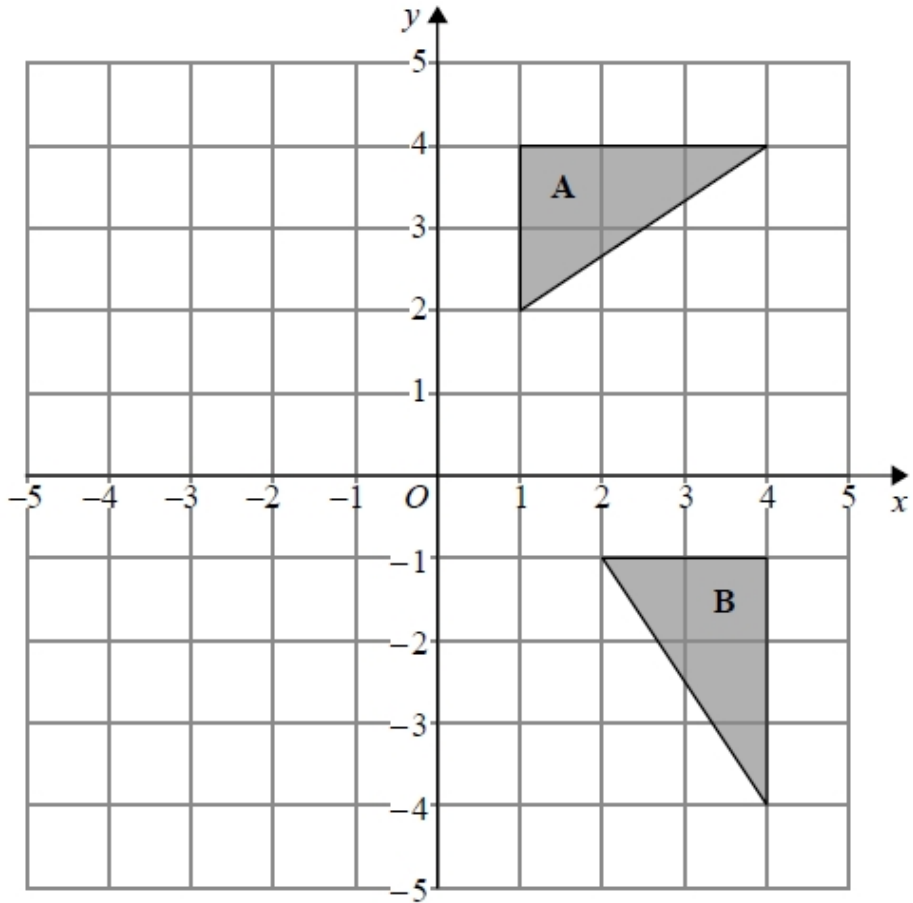
Find the column vector to describe the translation that maps A onto C.

Q5.

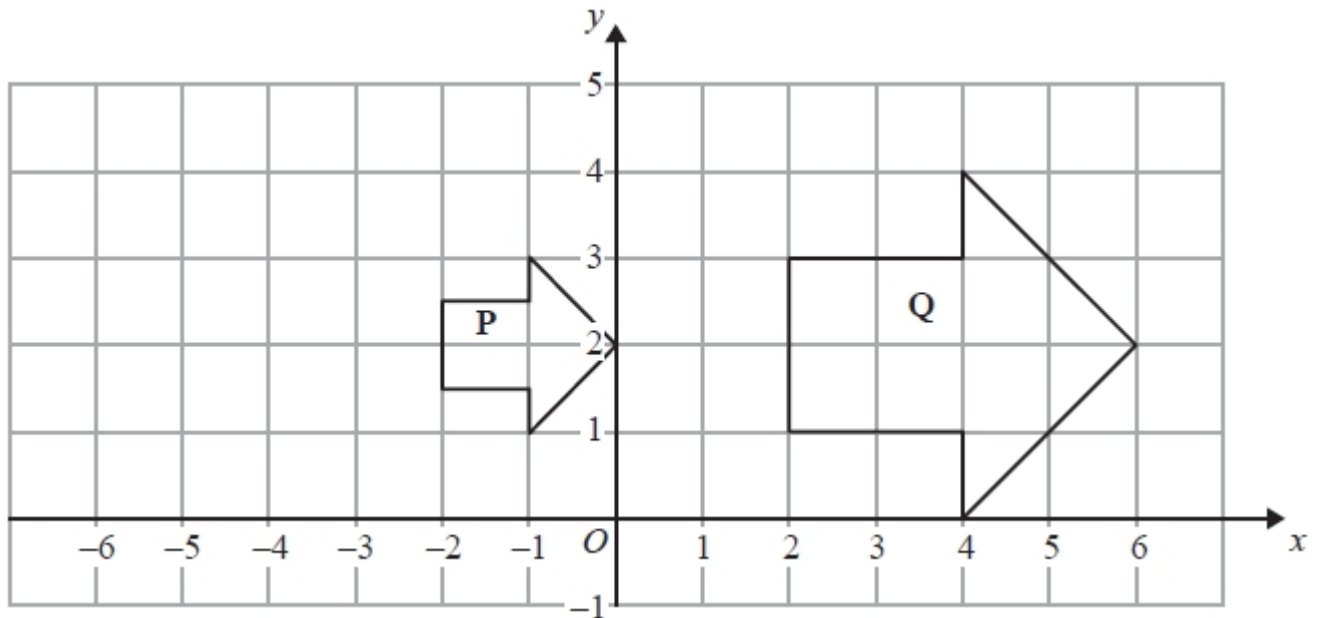


On the grid, reflect shape A in the line $y = x$.

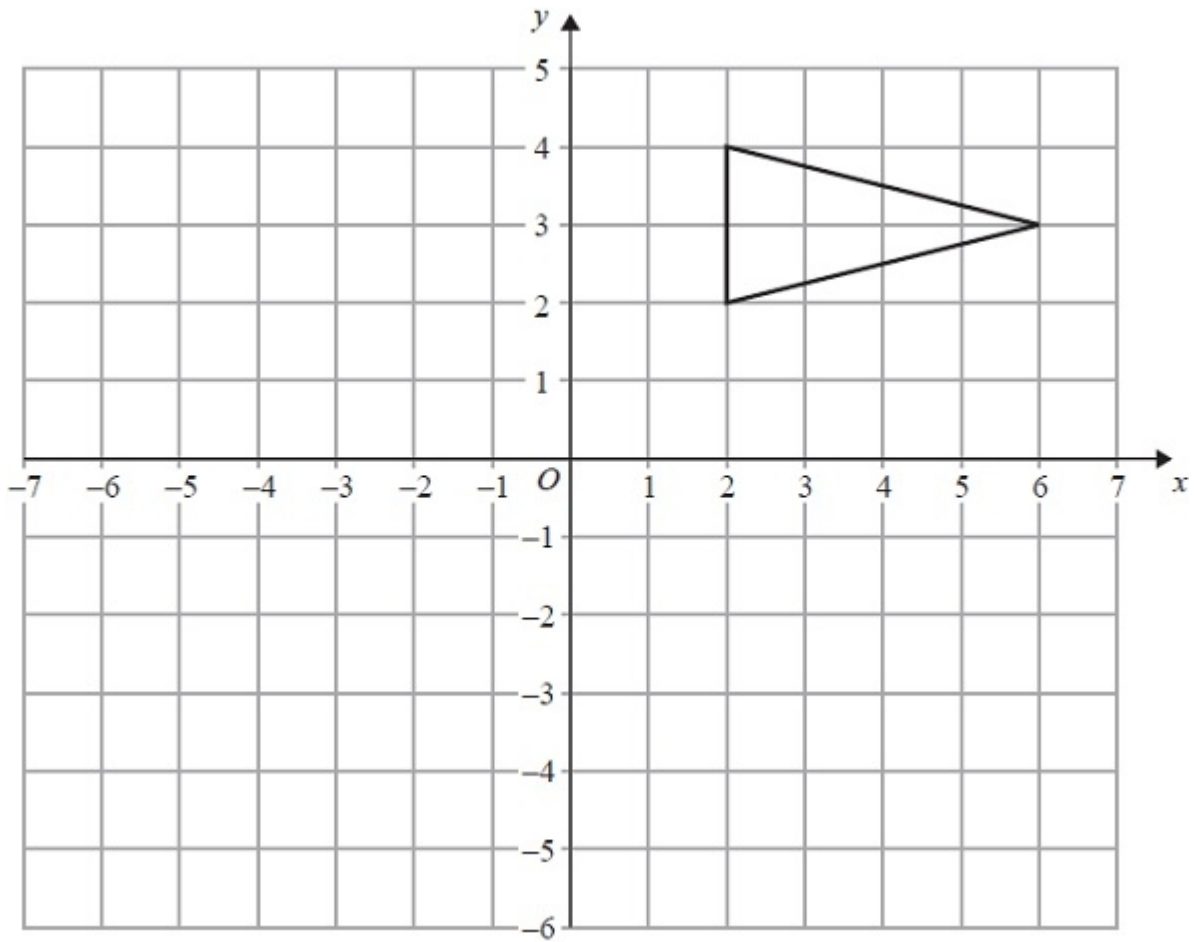
Q6. Describe fully the single transformation that maps triangle A onto triangle B.



Q7. Describe fully the single transformation that maps shape P onto shape Q.

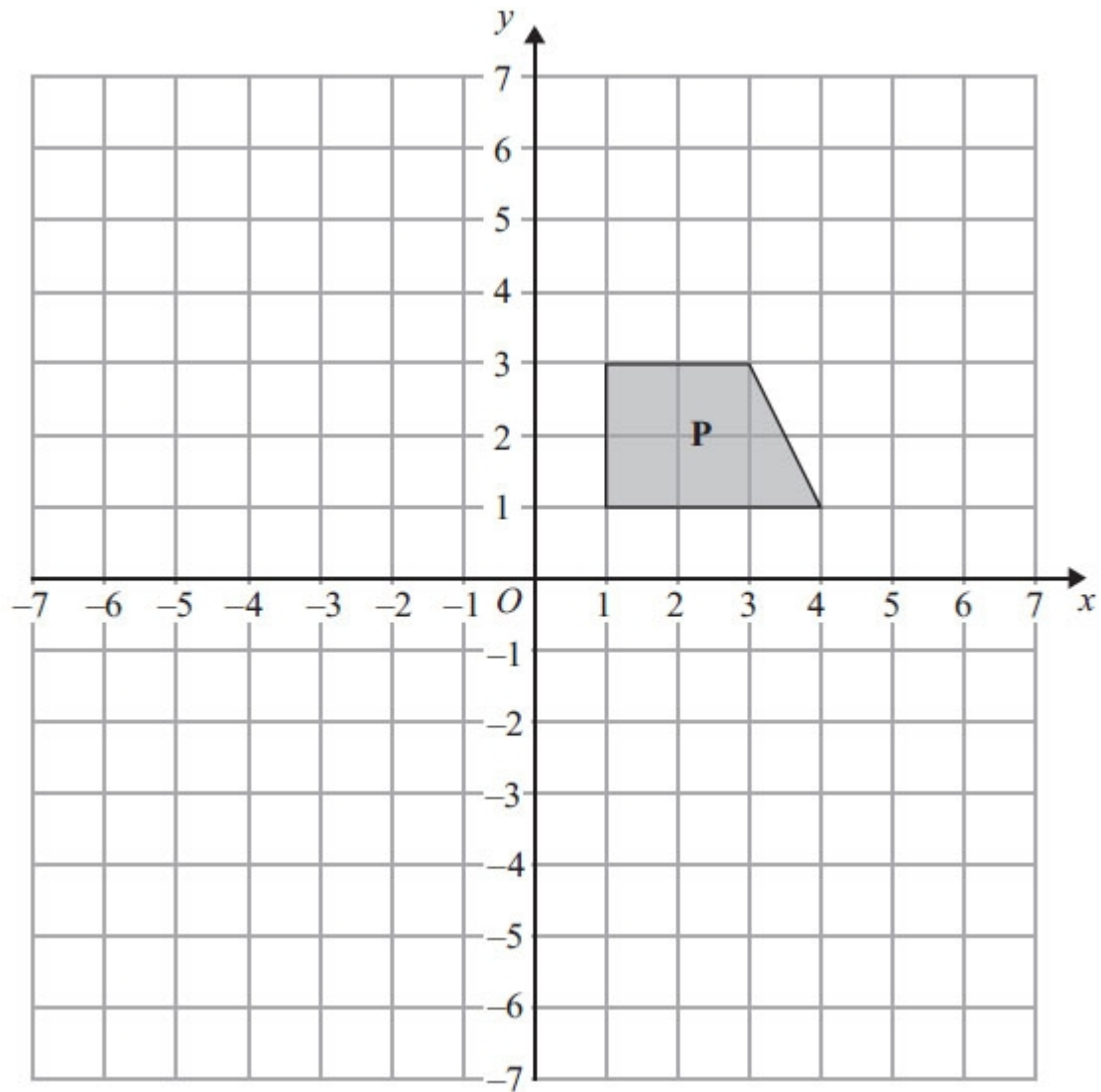


Q8.



On the grid, enlarge the triangle by scale factor $\frac{1}{2}$, centre $(0, -2)$.

Q9.

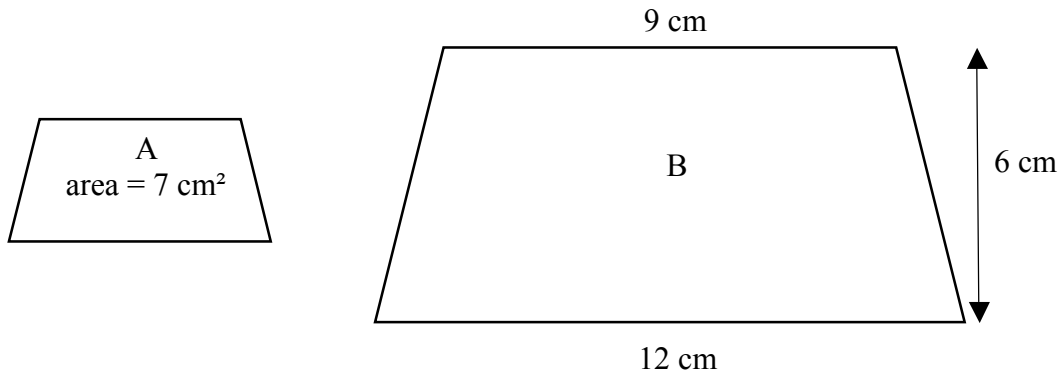


Shape **P** is reflected in the line $x = -1$ to give shape **Q**.

Shape **Q** is reflected in the line $y = 0$ to give shape **R**.

Describe fully the **single** transformation that maps shape **P** onto shape **R**.

Q10. Shape B is an enlargement of shape A.



Find the scale factor of the enlargement.

Topics listed in objectives

- Distinguish properties that are preserved under particular transformations;
- Recognise and describe rotations – know that they are specified by a centre and an angle;
- Rotate 2D shapes using the origin or any other point (not necessarily on a coordinate grid);
- Identify the equation of a line of symmetry;
- Recognise and describe reflections on a coordinate grid – know to include the mirror line as a simple algebraic equation, $x = a$, $y = a$, $y = x$, $y = -x$ and lines not parallel to the axes;
- Reflect 2D shapes using specified mirror lines including lines parallel to the axes and also $y = x$ and $y = -x$;
- Recognise and describe single translations using column vectors on a coordinate grid;
- Translate a given shape by a vector;
- Understand the effect of one translation followed by another, in terms of column vectors (to introduce vectors in a concrete way);
- Enlarge a shape on a grid without a centre specified;
- Describe and transform 2D shapes using enlargements by a positive integer, positive fractional, and negative scale factor;
- Know that an enlargement on a grid is specified by a centre and a scale factor;
- Identify the scale factor of an enlargement of a shape;
- Enlarge a given shape using a given centre as the centre of enlargement by counting distances from centre, and find the centre of enlargement by drawing;
- Find areas after enlargement and compare with before enlargement, to deduce multiplicative relationship (area scale factor); given the areas of two shapes, one an enlargement of the other, find the scale factor of the enlargement (whole number values only);
- Use congruence to show that translations, rotations and reflections preserve length and angle, so that any figure is congruent to its image under any of these transformations;
- Describe and transform 2D shapes using combined rotations, reflections, translations, or enlargements;
- Describe the changes and invariance achieved by combinations of rotations, reflections and translations.

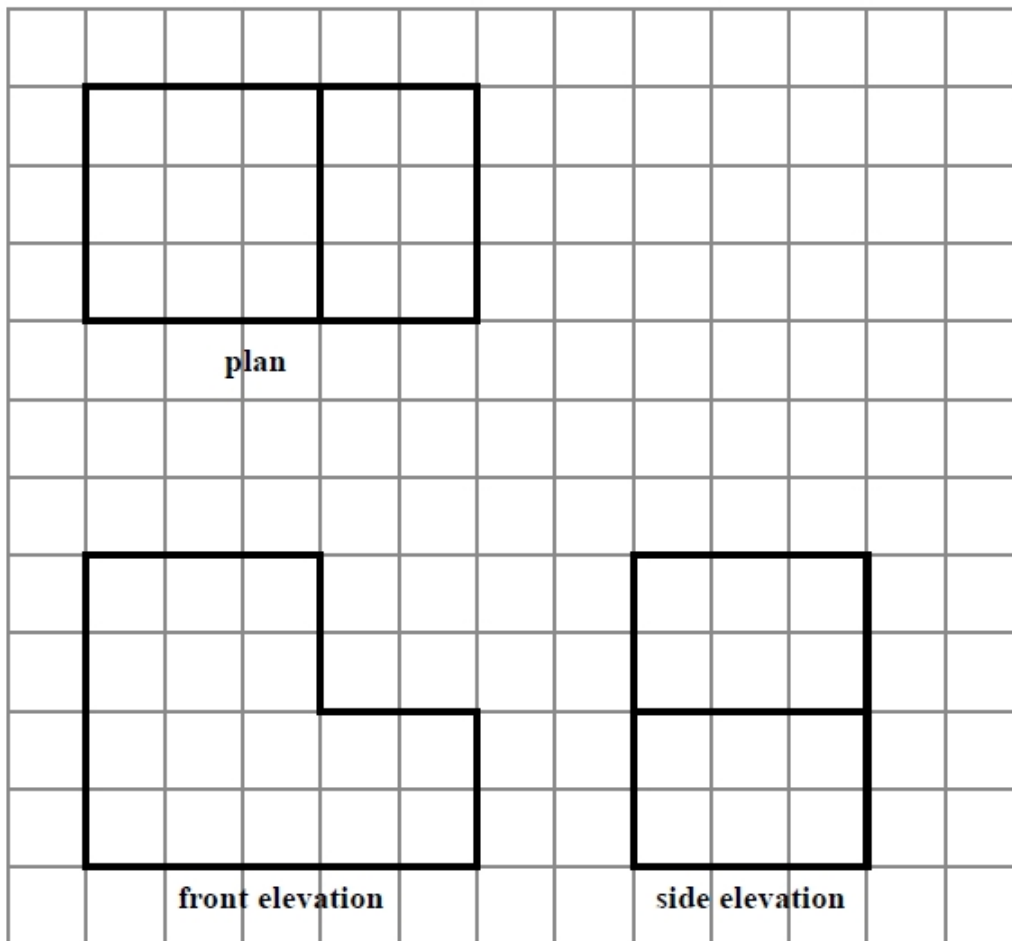
Answers

- Q1. C
- Q2. correctly drawn shape, enlarged by scale factor 3
- Q3. triangle with vertices at $(-2, 2)$, $(-2, 0)$, $(-1, -1)$
- Q4. 6
5
- Q5. shape with vertices at $(2, 1)$, $(4, 1)$, $(4, 0)$, $(3, 0)$
- Q6. rotation of 90° clockwise about $(0, 0)$
- Q7. enlargement, scale factor 2, centre $(-6, 2)$
- Q8. triangle with vertices at $(-1, -4)$, $(-1, -5)$, $(-3, -4.5)$
- Q9. rotation 180° about $(-1, 0)$
- Q10. 3

Higher tier unit 8b check in test

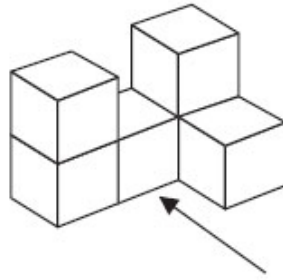
Non-calculator

Q1. The plan, front elevation and side elevation of a solid prism are drawn on a centimetre grid.

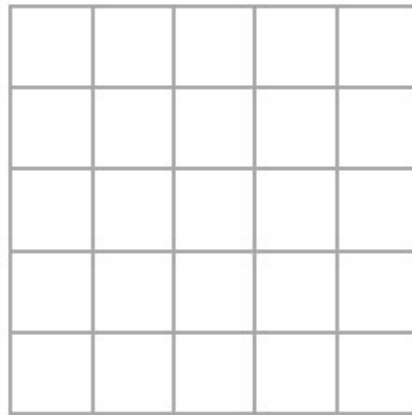


In the space below, draw a sketch of the solid prism.
Write the dimensions of the prism on your sketch.

- Q2. Naveed has some toy bricks.
 Each brick is a cube of side 1 cm.
 Naveed uses some of the bricks to make this solid shape.

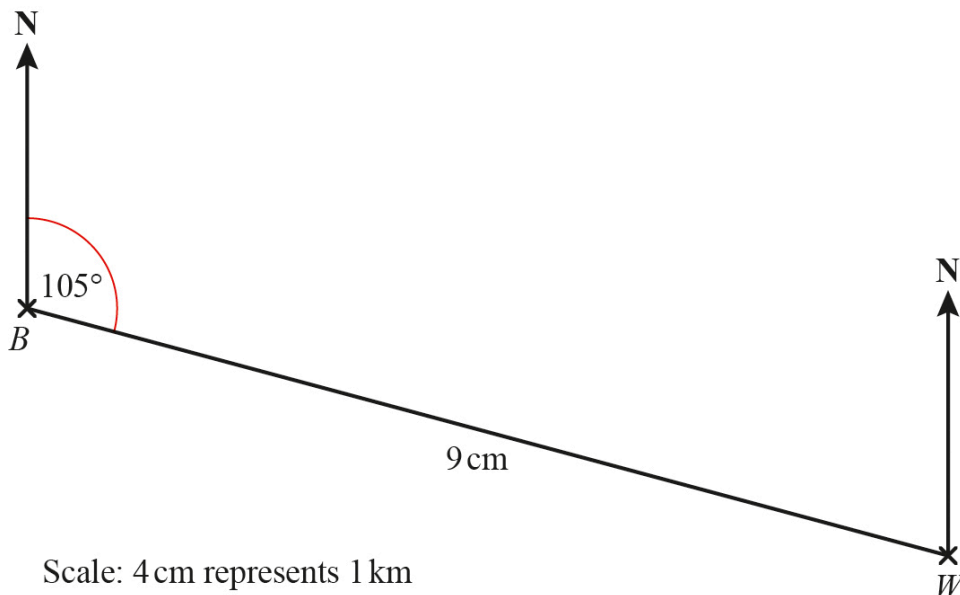


On the grid below, draw the view of the solid shape from the direction shown by the arrow.



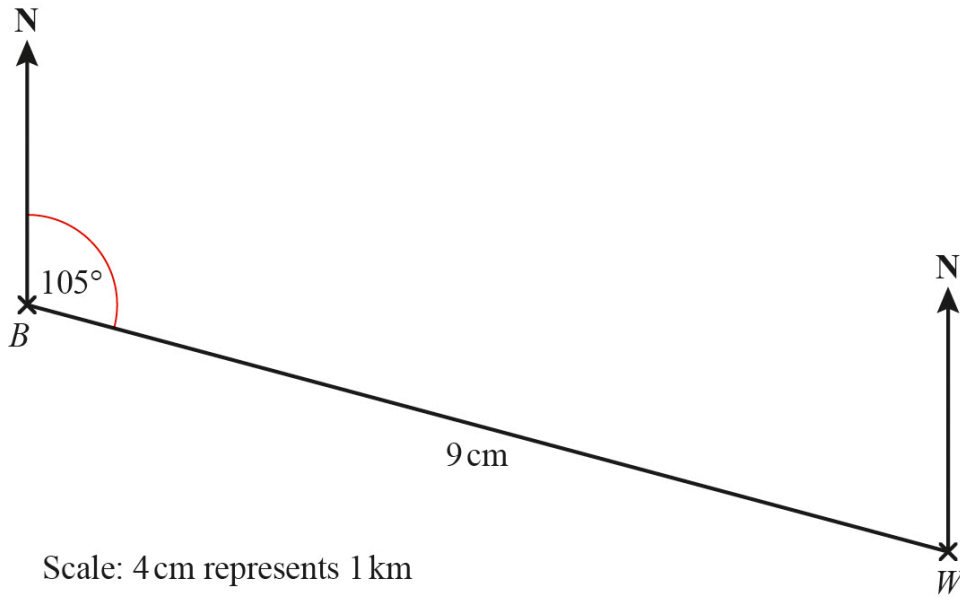
[Q3–5 linked]

- Q3. The diagram shows the positions of two villages, Beckhampton (B) and West Kennett (W).



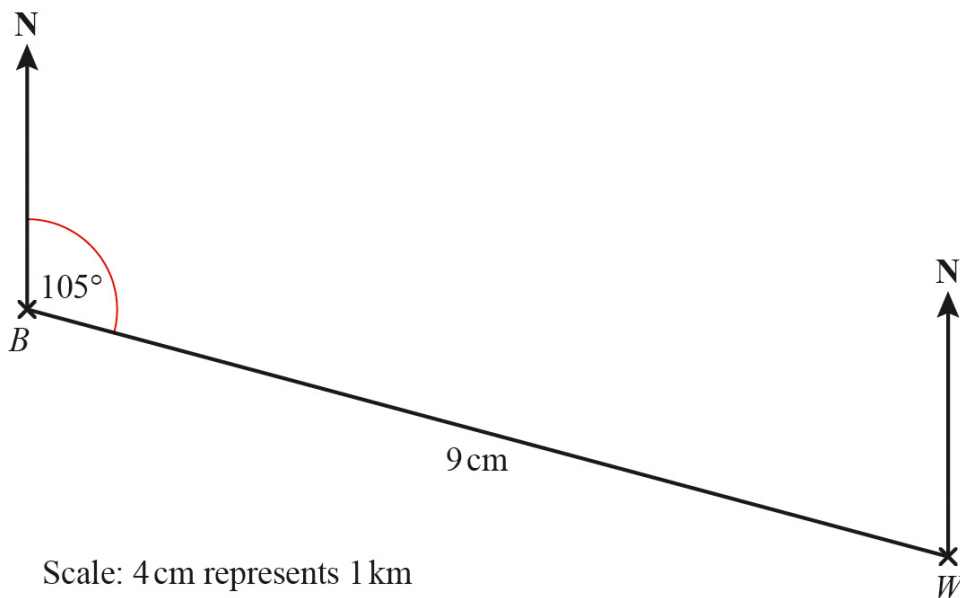
Work out the real distance, in km, of Beckhampton from West Kennett.

Q4. The diagram shows the positions of two villages, Beckhampton (B) and West Kennett (W).



Work out the bearing of Beckhampton from West Kennett.

Q5. The diagram shows the positions of two villages, Beckhampton (B) and West Kennett (W).

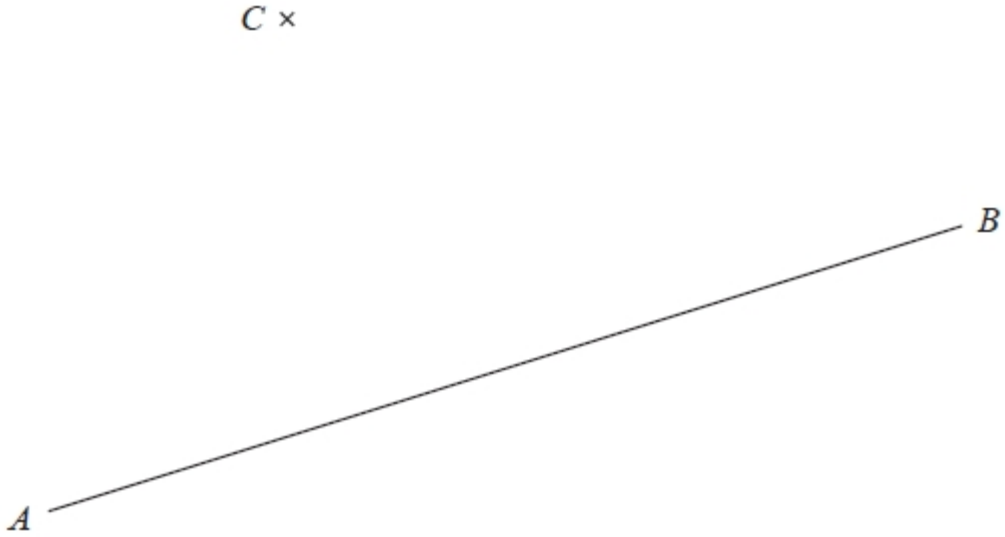


The village, Avebury (A), is 1.5 km from Beckhampton on a bearing of 038° .

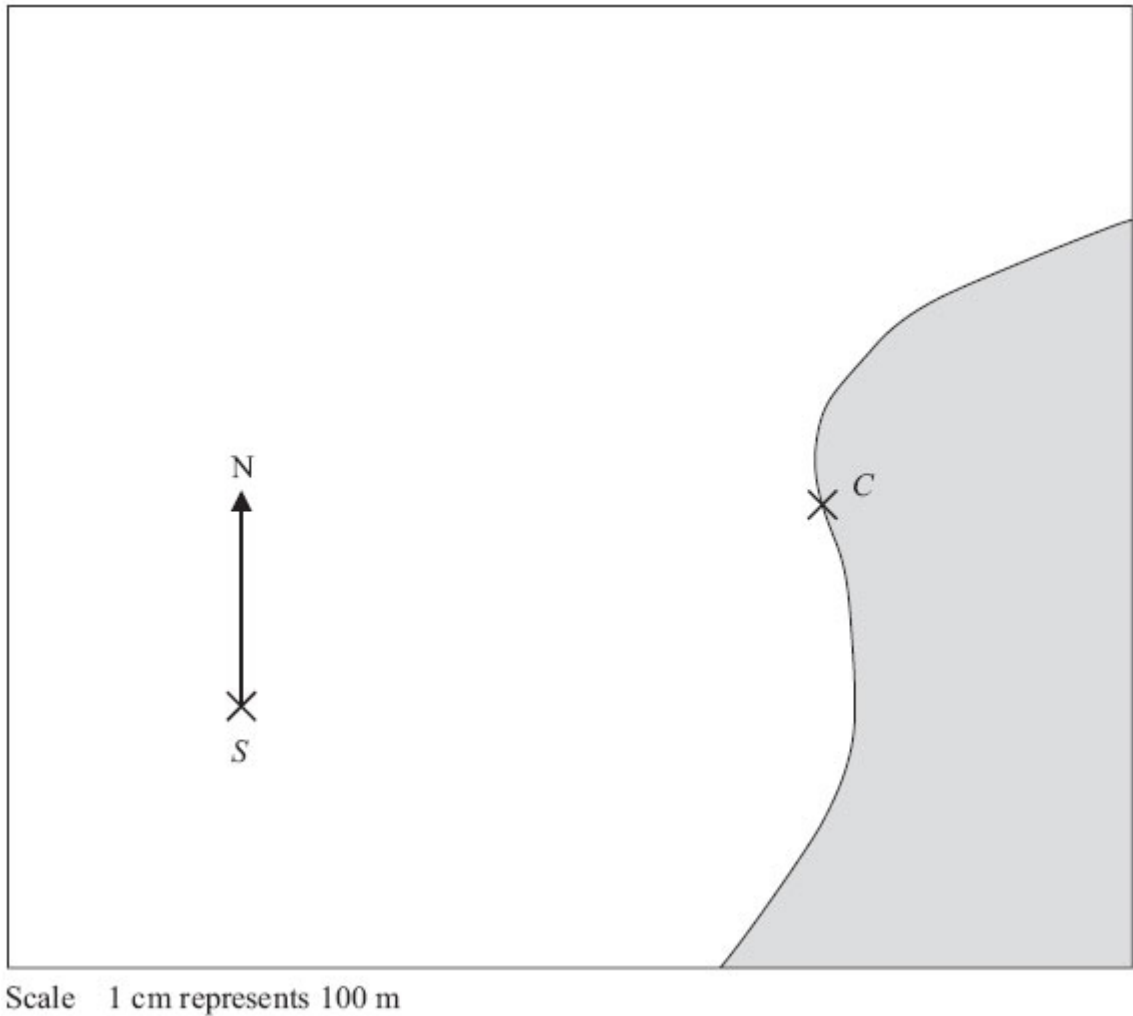
On the diagram, mark A with a cross (\times).

Label the cross A .

Q6. Use ruler and compasses to show the shortest possible line from C to the line AB .
You must show all your construction lines.



Q7. Here is a map.
The position of a ship, S, is marked on the map.



Point C is on the coast.

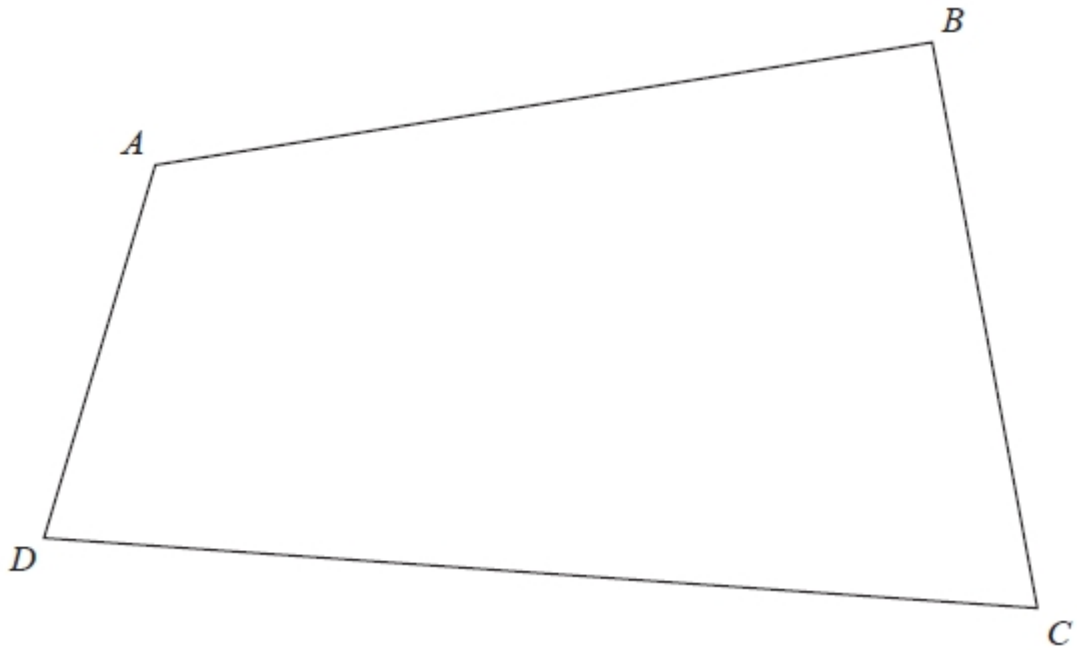
Ships must not sail closer than 500 m to point C.

The ship sails on a bearing of 037°

Will the ship sail closer than 500 m to point C?

You must explain your answer.

Q8. The diagram shows the plan of a park.



Scale: 1 cm represents 100 m

A fountain in the park is equidistant from A and from C . The fountain is exactly 700 m from D .

On the diagram, mark the position of the fountain with a cross (\times).

Q9. Here is a scale drawing of a rectangular garden $ABCD$.



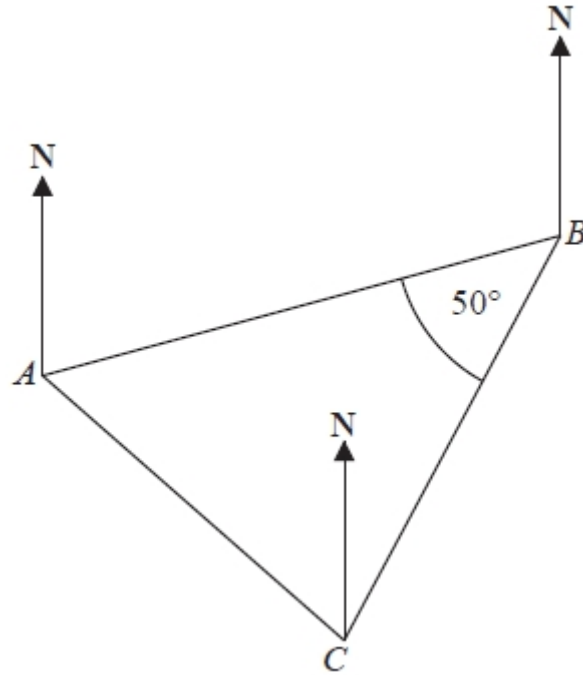
Scale: 1 cm represents 1 metre.

Jane wants to plant a tree in the garden

at least 5m from point C ,
nearer to AB than to AD
and less than 3m from DC .

On the diagram, shade the region where Jane can plant the tree.

Q10. The diagram shows the positions of three points, A , B and C , on a map.



The bearing of B from A is 070°

Angle ABC is 50°

$AB = CB$

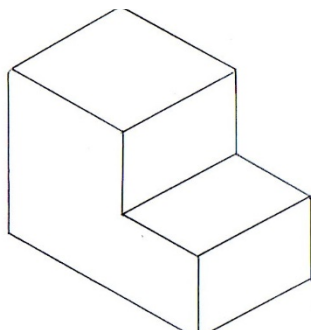
Work out the bearing of C from A .

Topics listed in objectives

- Understand and draw front and side elevations and plans of shapes made from simple solids;
- Given the front and side elevations and the plan of a solid, draw a sketch of the 3D solid;
- Use and interpret maps and scale drawings, using a variety of scales and units;
- Read and construct scale drawings, drawing lines and shapes to scale;
- Estimate lengths using a scale diagram;
- Understand, draw and measure bearings;
- Calculate bearings and solve bearings problems, including on scaled maps, and find/mark and measure bearings
- Use the standard ruler and compass constructions:
 - bisect a given angle;
 - construct a perpendicular to a given line from/at a given point;
 - construct angles of 90° , 45° ;
 - perpendicular bisector of a line segment;
- Construct:
 - a region bounded by a circle and an intersecting line;
 - a given distance from a point and a given distance from a line;
 - equal distances from two points or two line segments;
 - regions which may be defined by 'nearer to' or 'greater than';
- Find and describe regions satisfying a combination of loci, including in 3D;
- Use constructions to solve loci problems including with bearings;
- Know that the perpendicular distance from a point to a line is the shortest distance to the line.

Answers

Q1.



Q2.



Q3. 2.25 km

Q4. 255°

Q5. point on bearing 038° and 6 cm from B

Q6. accurate construction for perpendicular to AB from C

Q7. yes, with explanation

Q8. perpendicular bisector of line AC , circle centre D , radius 7 cm, position marked at intersection

Q9. arc radius 5cm centre C , bisector of angle BAD , line 3 cm from DC , correct region shaded

Q10. 135°