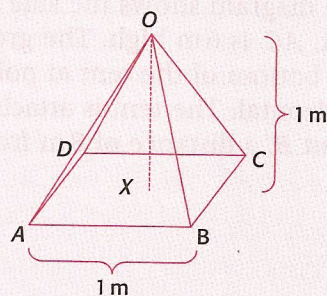


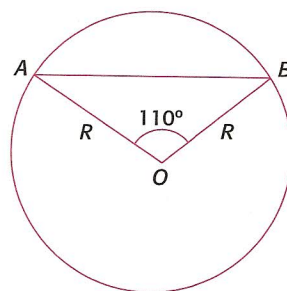
- 8 $OABCD$ is a squared-based pyramid. O is vertically above the centre of the base, X . $AB = 1$ m and $OX = 1$ m.
- Calculate the height of one of its triangular faces.
 - Hence calculate the surface area of the pyramid.
 - Calculate the angle that any of the triangular faces makes with the base of the pyramid.
 - Calculate the angle that OB makes with the plane $ABCD$.
 - Find the volume of the pyramid.



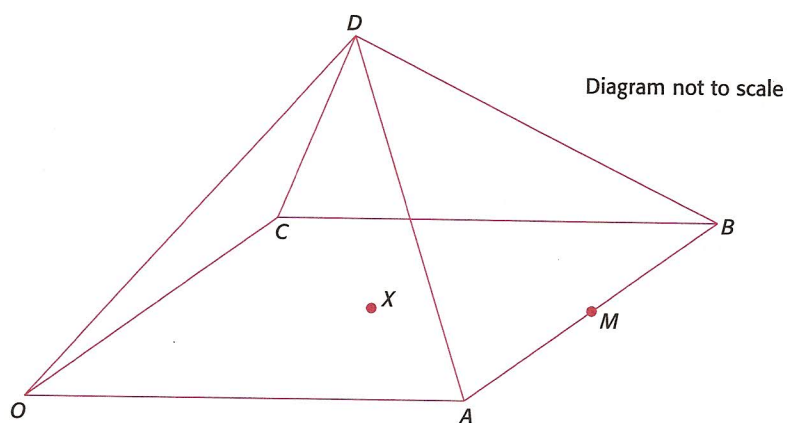
Past examination questions for topic 5

Paper 1

- 1 The diagram shows a circle of radius R and centre O . A triangle AOB is drawn inside the circle. The vertices of the triangle are at the centre, O , and at two points, A and B , on the circumference. Angle AOB is 110° .
- Given that the area of the circle is $36\pi\text{cm}^2$, calculate the length of the radius R .
 - Calculate the length of AB .
 - Write down the side length, L , of a square which has the same area as the given circle.
- 2 $OABCD$ is a square-based pyramid of side 4 cm as shown in the diagram. The vertex D is 3 cm directly above X , the centre of square $OABC$. M is the midpoint of AB .
- Find the length of XM .
 - Calculate the length of DM .
 - Calculate the angle between the face ABD and the base $OABC$.



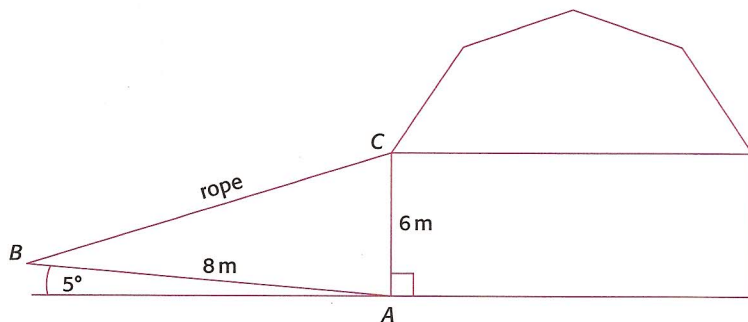
M06q9



N04q9

Topic 5 • Geometry and trigonometry

- 3 The diagram shows the side view of a tent. The side of the tent, AC , is 6 m high. The ground AB slopes upwards from the bottom of the tent at point A , at an angle of 5° from the horizontal. The tent is attached to the ground by a rope at point B , a distance of 8 m from its base.



- Calculate the angle BAC .
 - Calculate the length of the rope, BC .
 - Calculate the angle, CBA , that the rope makes with the sloping ground.
- 4 The figure shows two adjacent triangular fields, ABC and ACD , where $AD = 30$ m, $CD = 80$ m, $BC = 50$ m, angle $ADC = 60^\circ$ and angle $BAC = 30^\circ$.

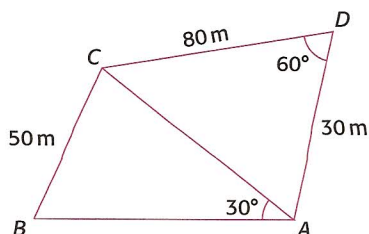
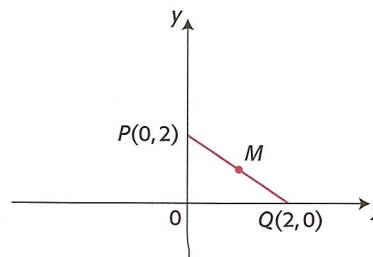


Diagram not to scale

- Using triangle ACD calculate the length AC .
 - Calculate the size of angle ABC .
- 5 A is the point $(2, 3)$ and B is the point $(4, 9)$.
- Find the gradient of the line segment AB .
 - Find the gradient of a line perpendicular to the line segment AB .
 - The line $2x + by - 12 = 0$ is perpendicular to the line segment AB . What is the value of b ?

- 6 The diagram shows the points P , Q and M . M is the midpoint of PQ .
- Write down the equation of the line PQ .
 - Write down the equation of the line through M which is perpendicular to the line PQ .



M04q14

M03q8

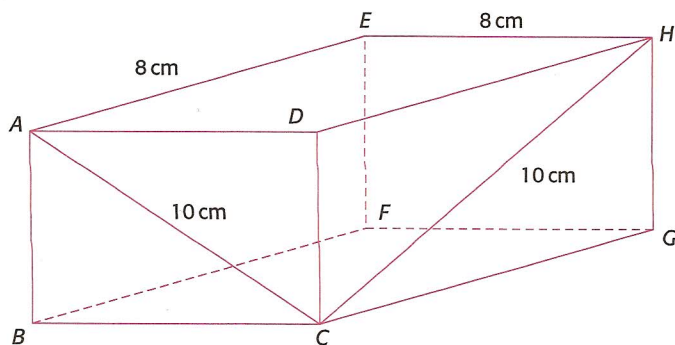
M01q11

M00q5

Paper 2

- 1 The figure below shows a rectangular prism with some side lengths and diagonal lengths marked.

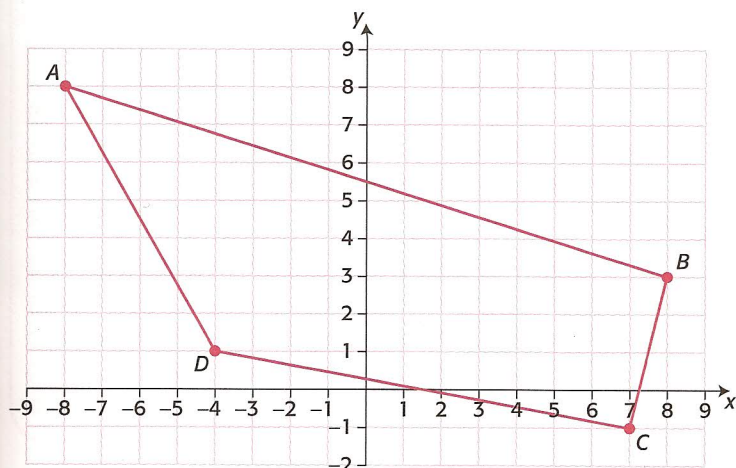
$AC = 10$ cm, $CH = 10$ cm, $EH = 8$ cm, $AE = 8$ cm.



- Calculate the length of AH .
- Find the size of angle ACH .
- Show that the total surface area of the rectangular prism is 320 cm².
- A triangular prism is enclosed within the planes $ABCD$, $CGHD$ and $ABGH$. Calculate the volume of this prism.

M06q2(ii)

- 2 The vertices of quadrilateral $ABCD$ as shown in the diagram are $A(-8, 8)$, $B(8, 3)$, $C(7, -1)$ and $D(-4, 1)$.



The gradient of line AB is $-\frac{5}{16}$.

- Calculate the gradient of line DC .
- State whether or not DC is parallel to AB and give a reason for your answer.

The equation of the line through A and C is $3x + 5y = 16$.

- Find the equation of the line through B and D expressing your answer in the form $ax + by = c$, where a, b and $c \in \mathbb{Z}$.

The lines AC and BD intersect at point T .

- Calculate the coordinates of T .

N05q3

Topic 5 • Geometry and trigonometry

- 3 i a** A farmer wants to construct a new fence across a field. The plan is shown in the diagram. The new fence is indicated by a dotted line. Calculate the length of the fence.
- b** The fence creates two sections of land. Find the area of the smaller section of land, ABC , given the additional information shown below.

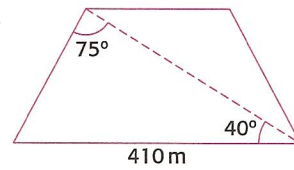


Diagram not to scale

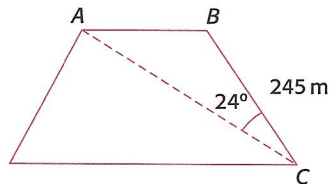


Diagram not to scale

- ii** Find the volume of this prism.

M05q2

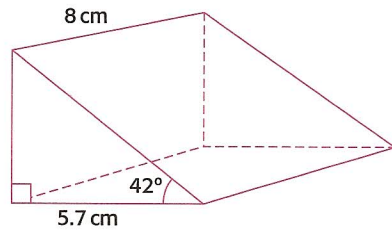


Diagram not to scale

- 4** The line L_1 shown on the set of axes below has equation $3x + 4y = 24$. L_1 cuts the x -axis at A and the y -axis at B .

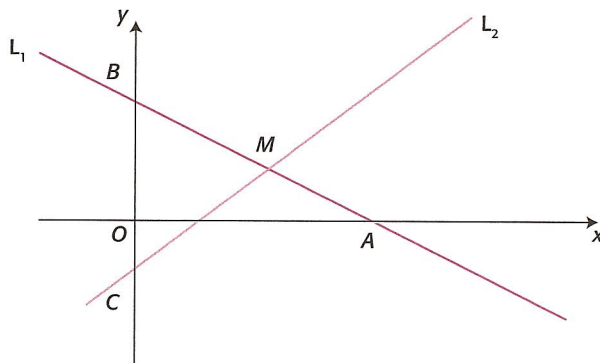


Diagram not to scale

- a** Write down the coordinates of A and B .
 M is the midpoint of the line segment AB .
- b** Write down the coordinates of M .
 The line L_2 passes through the point M and the point $C(0, -2)$.
- c** Write down the equation of L_2 .
- d** Find the length of
 i MC
 ii AC .
- e** The length of AM is 5. Find
 i the size of angle CMA
 ii the area of the triangle with vertices C, M and A .

M00q4