



## National 5 Mathematics

### Pythagoras' Theorem - Questions

Note that Pythagoras' Theorem also comes up in 'Properties of Shapes' questions so you may wish to look at those. Also, be aware that the primary challenge with Pythagoras questions is recognizing that they are Pythagoras questions as you won't be explicitly told so in the question.

Marks are indicated in brackets after each question number

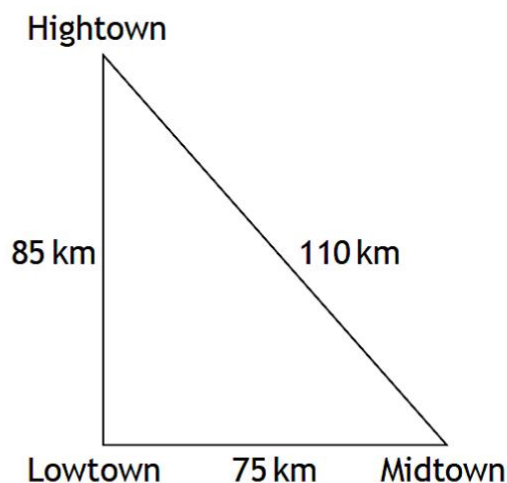
#### **2014 Paper 2 Question 6, (4)**

The diagram below shows the position of three towns.

Lowtown is due west of Midtown.

The distance from

- Lowtown to Midtown is 75 kilometres.
- Midtown to Hightown is 110 kilometres.
- Hightown to Lowtown is 85 kilometres.



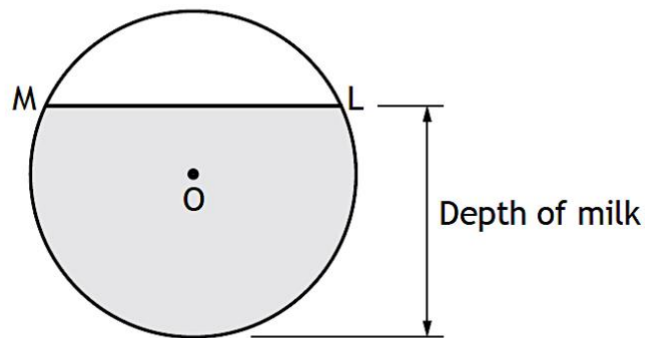
Is Hightown directly north of Lowtown?

**Justify your answer.**



### 2015 Paper 2 Question 12, (4)

The diagram below shows the circular cross-section of a milk tank.



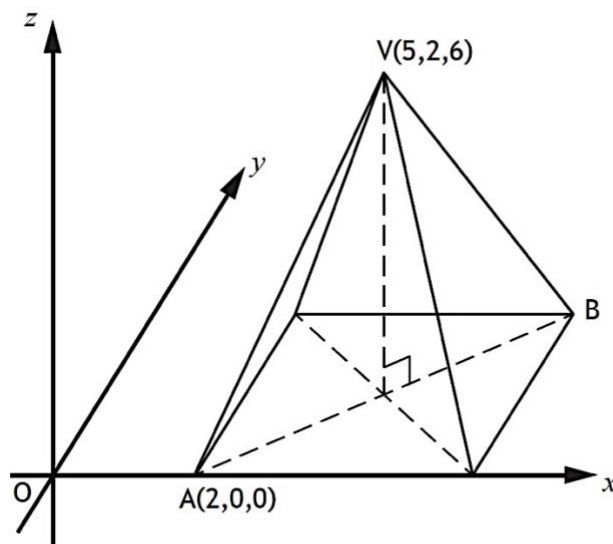
The radius of the circle, centre  $O$ , is 1.2 metres.

The width of the surface of the milk in the tank, represented by  $ML$  in the diagram, is 1.8 metres.

Calculate the depth of the milk in the tank.

### 2016 Paper 1 Question 7, (4)

The diagram shows a rectangular based pyramid, relative to the coordinate axes.



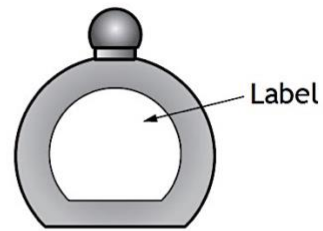
- $A$  is the point  $(2,0,0)$ .
- $V$  is the point  $(5,2,6)$ .

(a) Write down the coordinates of  $B$ .

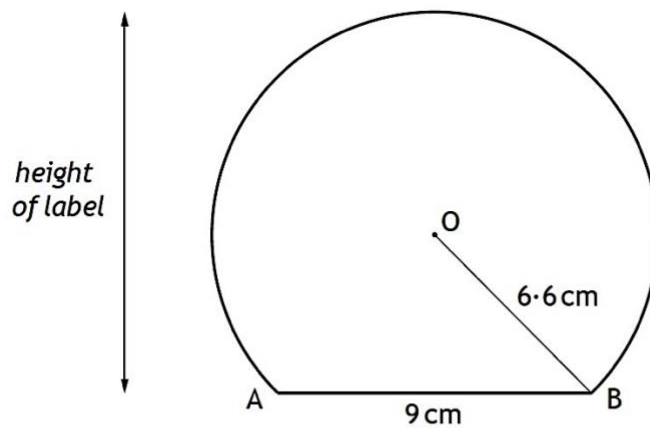


### 2016 Paper 2 Question 16, (4)

This perfume bottle has a label in the shape of part of a circle.



A diagram of the label is shown below.



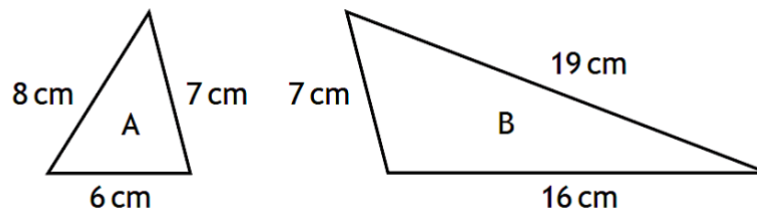
- The centre of the circle is O.
- The chord AB is 9 centimetres.
- The radius OB is 6.6 centimetres.

Find the height of the label.

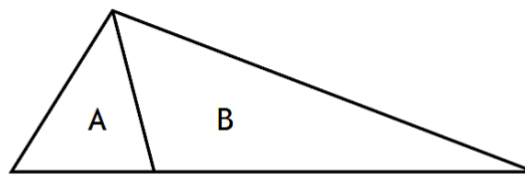


**2017 Paper 2 Question 7, (3)**

Triangles A and B are shown below.



The triangles are placed together to form the larger triangle shown below.

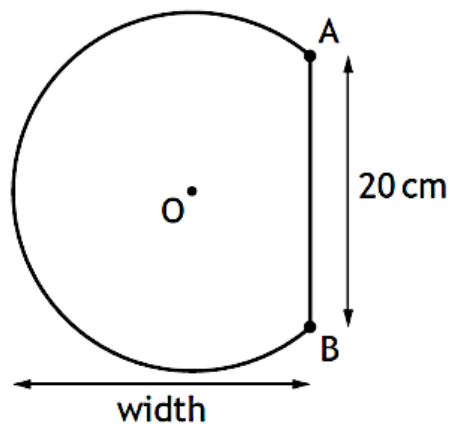


Is this larger triangle right-angled?

Justify your answer.

**2018 Paper 2 Question 12, (4)**

The shape below is part of a circle, centre O.



The circle has radius 13 centimetres.

AB is a chord of length 20 centimetres.

Calculate the width of the shape.



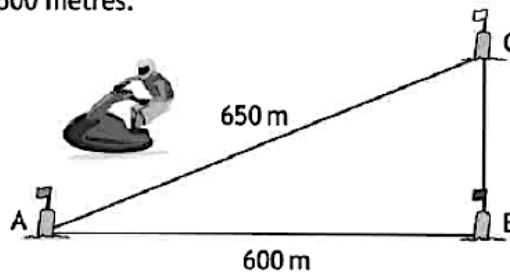
### 2019 Paper 2 Question 11, (4)

The diagram shows the course for a jet-ski race.

The course is indicated by markers A, B and C.

The total length of the course is 1500 metres.

- B is 600 metres from A
- C is 650 metres from A
- C is due north of B



Determine whether B is due east of A.

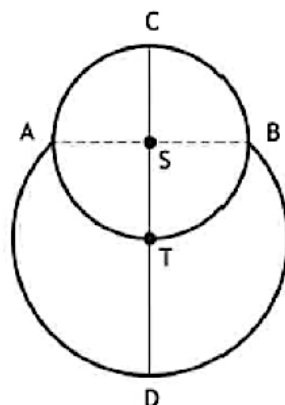
Justify your answer.

### 2019 Paper 2 Question 18, (4)

The picture shows a cartoon snowman.



The diagram below represents the snowman.



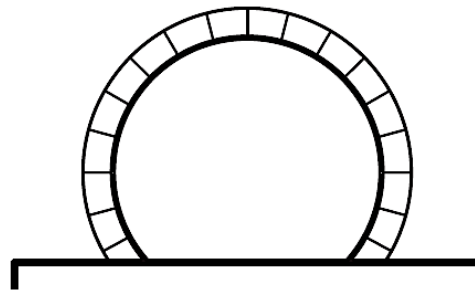
- The head is a small circle, centre S, with diameter 15 centimetres
- The body is part of a larger circle, centre T
- The point T lies on the circumference of the small circle
- The points A and B lie on the circumferences of both circles

Calculate CD, the height of the snowman.

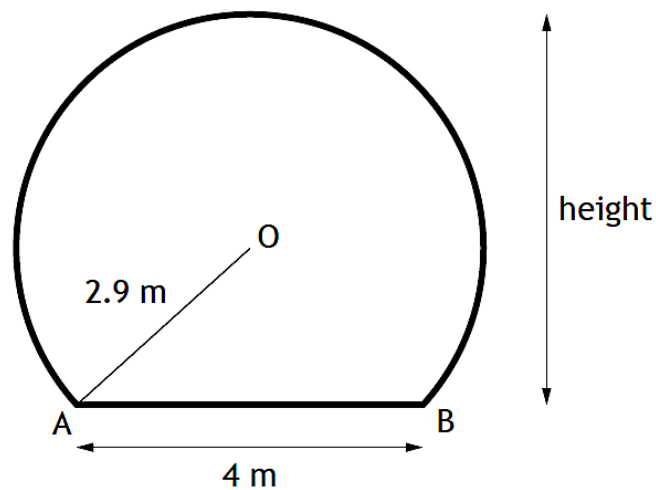


2022 Paper 2 Question 8, (4)

A train tunnel has a circular cross-section with a horizontal floor.



A diagram of the cross-section is shown below.



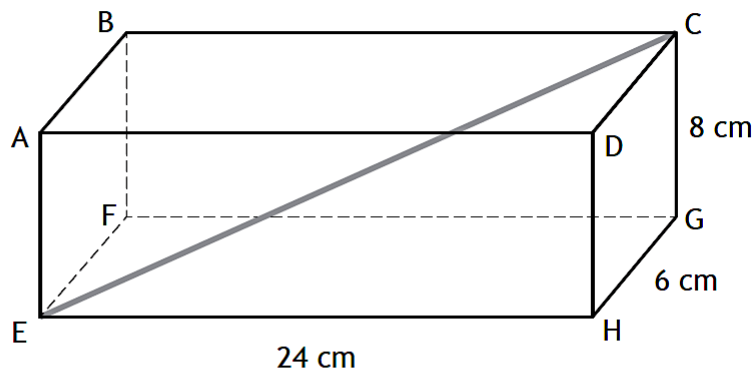
- The centre of the circle is O.
- Chord AB is 4 metres.
- The radius OA is 2.9 metres.

Calculate the height of the tunnel.



### 2022 Paper 2 Question 11, (3)

The diagram shows a cuboid, ABCDEFGH.

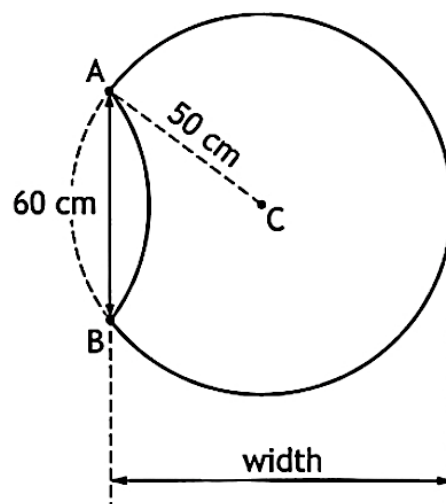


- The length of the cuboid, EH, is 24 centimetres.
- The breadth of the cuboid, HG, is 6 centimetres.
- The height of the cuboid, CG, is 8 centimetres.

Calculate the length of EC, the space diagonal of the cuboid.

### 2023 Paper 1 Question 10, (4)

The diagram below shows a single slab.



The circle, centre C, has a radius of 50 centimetres.

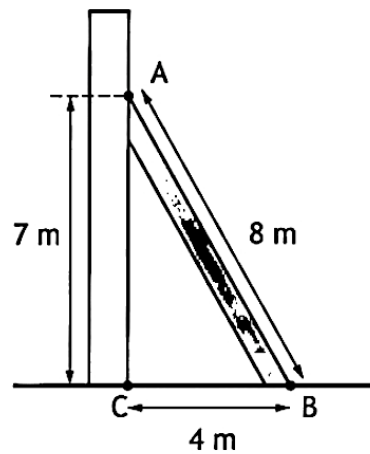
Length AB is 60 centimetres.

Calculate the width of the paving slab.



2023 Paper 2 Question 8, (4)

A wooden beam is used to support a wall built on horizontal ground as shown in the diagram.



The edge of the beam, AB, is 8 metres long.

C is at the foot of the wall.

A is 7 metres from C.

B is 4 metres from C.

Determine whether the wall is perpendicular to the ground.

Justify your answer.