

pythag and trig q studies

57 min
64 marks

1. A room is in the shape of a cuboid. Its floor measures 7.2 m by 9.6 m and its height is 3.5 m.

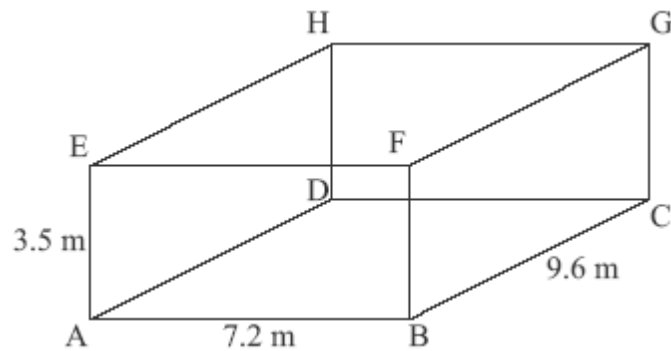


diagram not to scale

- (a) Calculate the length of AC. (2)
- (b) Calculate the length of AG. (2)
- (c) Calculate the angle that AG makes with the floor. (2)

(Total 6 marks)

2. A rectangular cuboid has the following dimensions.

Length 0.80 metres (AD)
Width 0.50 metres (DG)
Height 1.80 metres (DC)

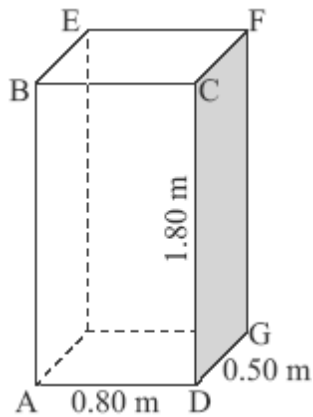


diagram not to scale

- (a) Calculate the length of AG.

(2)

- (b) Calculate the length of AF.

(2)

- (c) Find the size of the angle between AF and AG.

(2)

(Total 6 marks)

3. The right pyramid shown in the diagram has a square base with sides of length 40 cm. The height of the pyramid is also 40 cm.

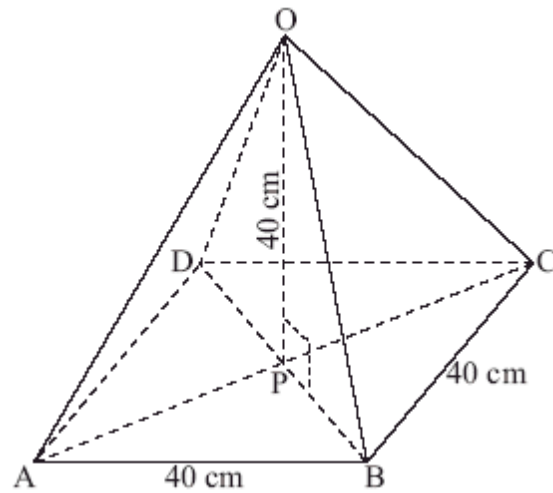


diagram not to scale

- (a) Find the length of OB. (4)
- (b) Find the size of angle \widehat{OBP} . (2)

(Total 6 marks)

4. Triangle ABC is drawn such that angle \widehat{ABC} is 90° , angle \widehat{ACB} is 60° and AB is 7.3 cm.

- (a) (i) Sketch a diagram to illustrate this information. Label the points A, B, C. Show the angles 90° , 60° and the length 7.3 cm on your diagram.
- (ii) Find the length of BC. (3)

Point D is on the straight line AC extended and is such that angle \widehat{CDB} is 20° .

- (b) (i) Show the point D and the angle 20° on your diagram.
- (ii) Find the size of angle \widehat{CBD} . (3)

(Total 6 marks)

5. The diagram shows a pyramid VABCD which has a square base of length 10 cm and edges of length 13 cm. M is the midpoint of the side BC.

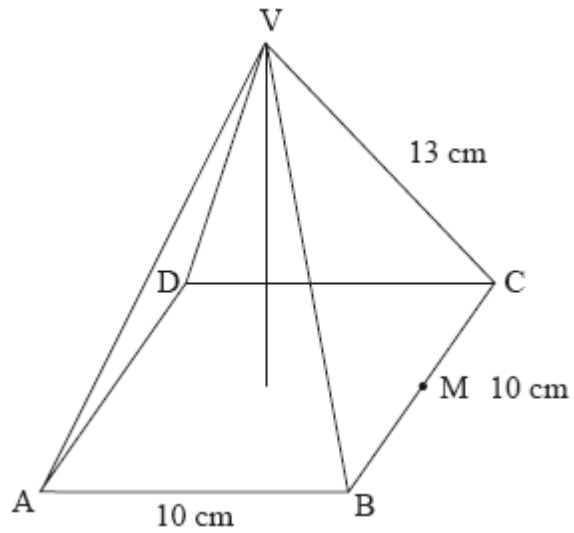
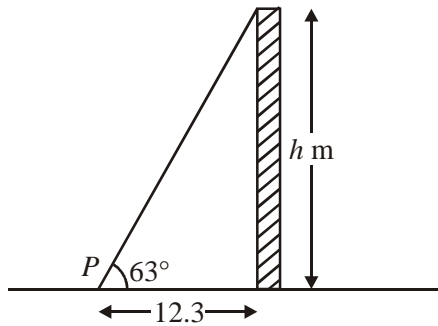


diagram not to scale

- (a) Calculate the length of VM. (2)
- (b) Calculate the vertical height of the pyramid. (2)
- (c) Calculate the angle between a sloping face of the pyramid and its base. (2)
- (Total 6 marks)**

6. The diagram shows a point P , 12.3 m from the base of a building of height h m. The angle measured to the top of the building from point P is 63° .



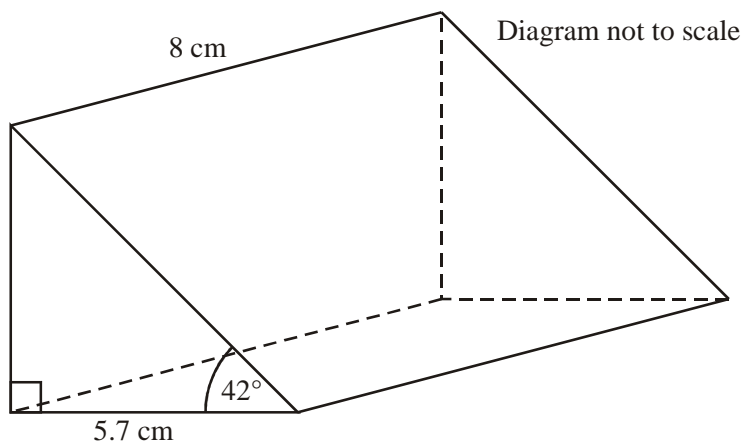
- (a) Calculate the height h of the building.

Consider the formula $h = 4.9t^2$, where h is the height of the building and t is the time in seconds to fall to the ground from the top of the building.

- (b) Calculate how long it would take for a stone to fall from the top of the building to the ground.

(Total 6 marks)

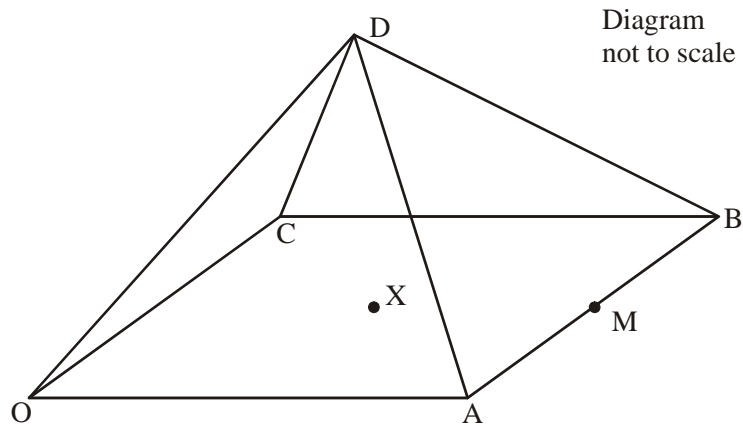
7. Find the volume of the following prism.



(Total 4 marks)

8. 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.

- (a) Find the length of XM.
- (b) Calculate the length of DM.
- (c) Calculate the angle between the face ABD and the base OABC.



(Total 8 marks)

9. The following diagram shows the rectangular prism ABCDEFGH. The length is 5 cm, the width is 1 cm, and the height is 4 cm.

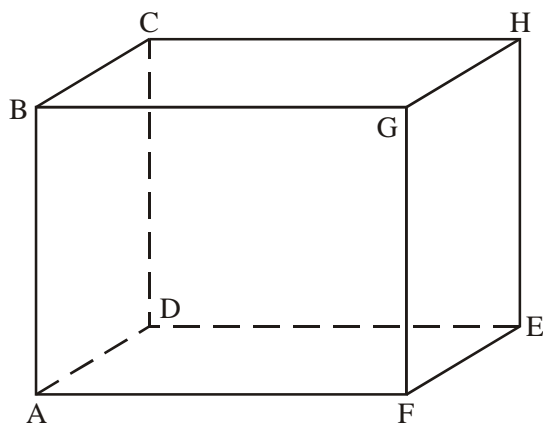
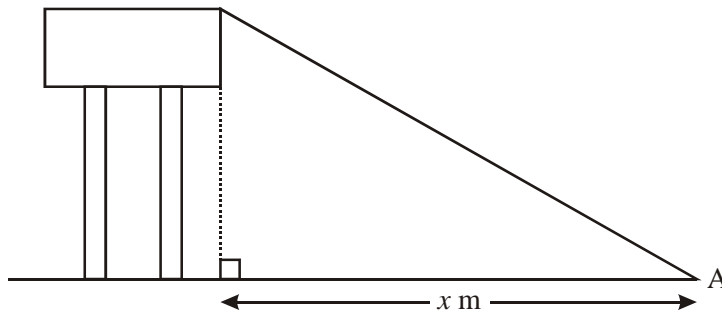


Diagram not to scale

- (a) Find the length of [DF].
- (b) Find the length of [CF].

(Total 8 marks)

10. The diagram shows a water tower standing on horizontal ground. The height of the tower is 26.5 m.



From a point A on the ground the angle of elevation to the top of the tower is 28° .

- (a) On the diagram, show and label the angle of elevation, 28° .
- (b) Calculate, **correct to the nearest metre**, the distance x m.

(Total 4 marks)

11. The height of a vertical cliff is 450 m. The angle of elevation from a ship to the top of the cliff is 23° . The ship is x metres from the bottom of the cliff.

- (a) Draw a diagram to show this information.

Diagram:

- (b) Calculate the value of x .

(Total 4 marks)