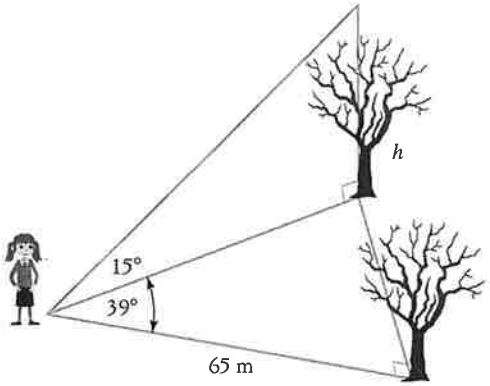
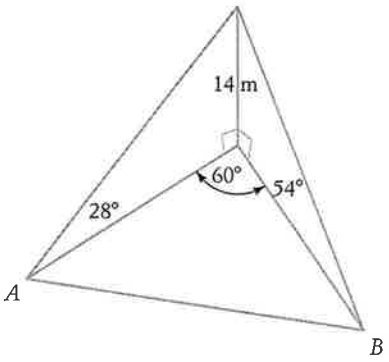
WORKSHEET

3D trigonometry

1 Isabella stands in a field and observes that the angle between the lines to the bases of 2 trees is 39°, while the angle of elevation to one tree is 15°. If Isabella is 65 metres from the other tree, find the height h of the first tree.

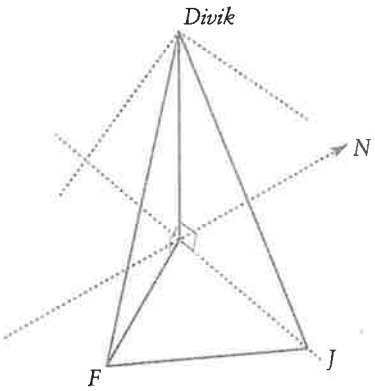


2 Find the distance from A to B.



3 Divik is looking out of a window 35 m above the ground. He sees his friend James east of him at an angle of depression of 34°. His friend Fahmid is at a bearing of 150° at an angle of depression of 41°.

a Show these details on this diagram.

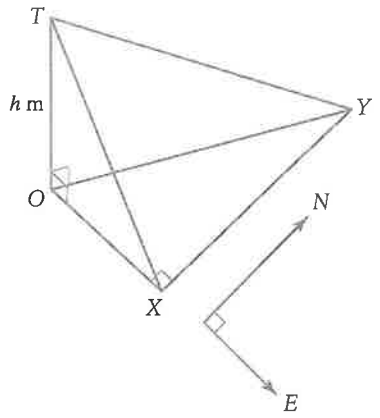


b Find the distance between Fahmid and James.

4 Annelise walks 1000 metres due north along a road from point X to point Y. The point X is due east of a tower OT, where T is the top of the tower. The height of the tower above point O is h metres.

When Annelise stood at X, the angle of elevation was 18°. From point Y, the angle of elevation to the top of the tower is 12°.

a Add all the given information to this diagram.



b Show that $OX = h \cot 18°$.

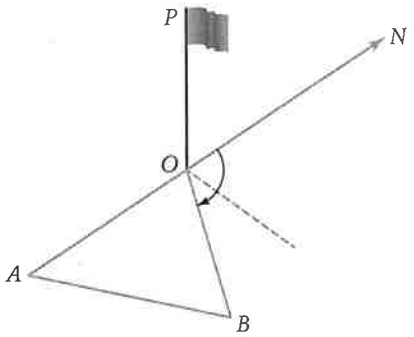
c Show that $OY = h \cot 12°$.

d Using $\triangle OXY$, show that $h^2 = \dfrac{1000^2}{\cot^2 12° - \cot^2 18°}$.

e Hence, find the value of h, correct to one decimal place.

5 From a point A due south of a flagpole, the angle of elevation of the top of the pole P, is 38°. From another point B, on a bearing of 117° from the pole, the angle of elevation of P is 36°. The distance AB is 110 metres. Let h be the height of the flagpole.

a Add all the given information to this diagram.



b Show that $OA = h \cot 38°$ and $OB = h \cot 36°$.

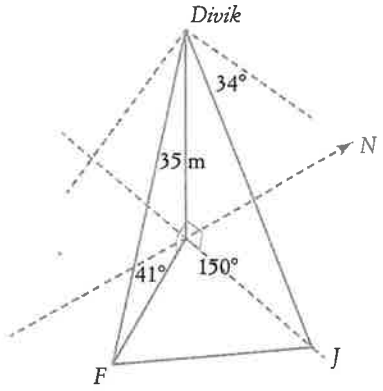
c Hence find, correct to one decimal place, the height of the flagpole.

Answers

1 22.4 m

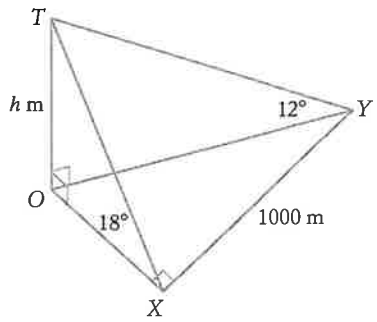
2 23 m

3 a



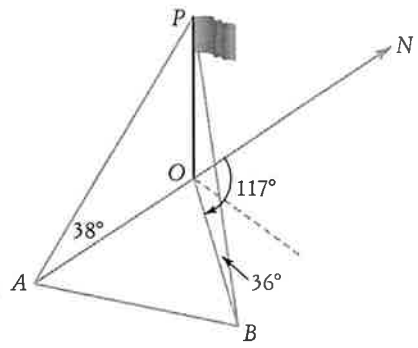
b 47.2 m

4 a



e 281.0 m

5 a



c 79.1 m