ANSWERS

Basic Trigonometry

12. In the following diagram, $AB = 17{\cdot}5$ m, $DC = 19{\cdot}6$ m, $B\hat{D}C = 27°$ and $D\hat{C}A = 90°$.

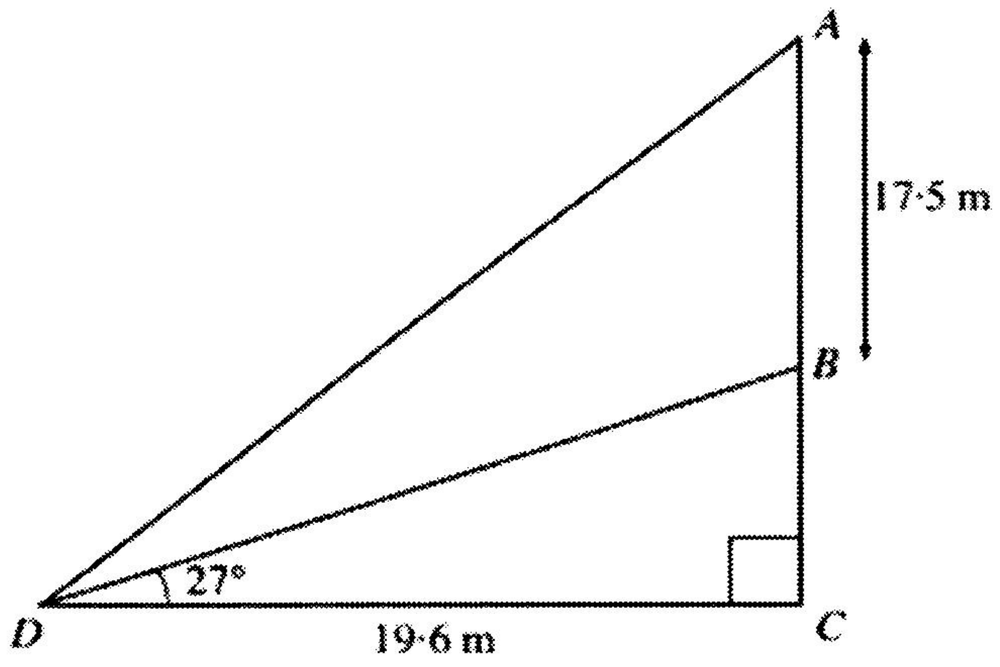


Diagram not drawn to scale.

Calculate the size of $A\hat{D}C$.

$\frac{O}{A} = \frac{BC}{19{\cdot}6} = \tan 27°$ (1)

$BC = 19{\cdot}6 \times \tan 27°$ (1)

$BC = 9{\cdot}98$ (1)

$\therefore AC = 27{\cdot}5$ (1)

$\tan A\hat{D}C = \frac{27{\cdot}5}{19{\cdot}6}$ (1)

$\tan^{-1}(1{\cdot}40306\,1224) = 54{\cdot}5°$ (2)

[8]

(1)

So

12. *(a)*

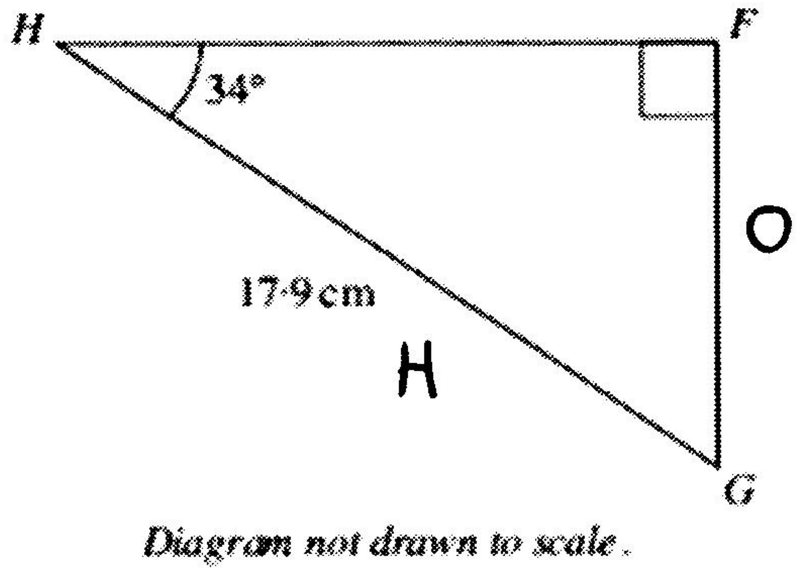


Diagram not drawn to scale.

Calculate the length of *FG*.

$\sin 34° = \frac{O}{17.9}$ (1)

$17.9 \times \sin 34° = O$ (1)

$O = 10\text{cm}.$ (1)

[3]

(b)

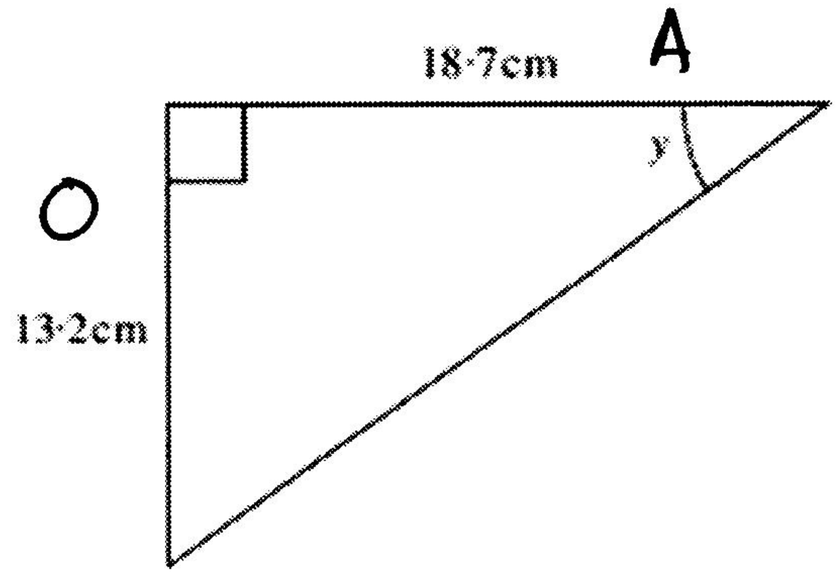


Diagram not drawn to scale.

Calculate the size of the angle *y*.

$\tan y = \frac{13.2}{18.7}$ (1)

$\tan^{-1}(0.705882352) = y$ (1)

$y = 35.2°$ (1)

[3]

9. *(a)*

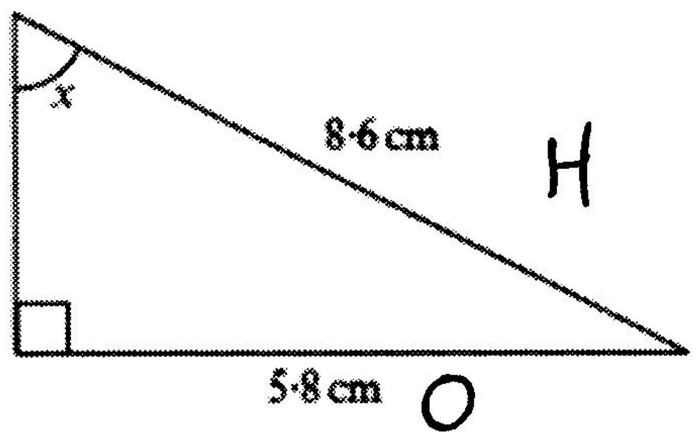


Diagram not drawn to scale

Calculate the size of the angle marked *x*.

$\sin x = \frac{O}{H} = \frac{5.8}{8.6}$ (1)

$\sin^{-1}(0.674418604) = x$ (1)

$x = 42.4°$ (1)

[3]

(b)

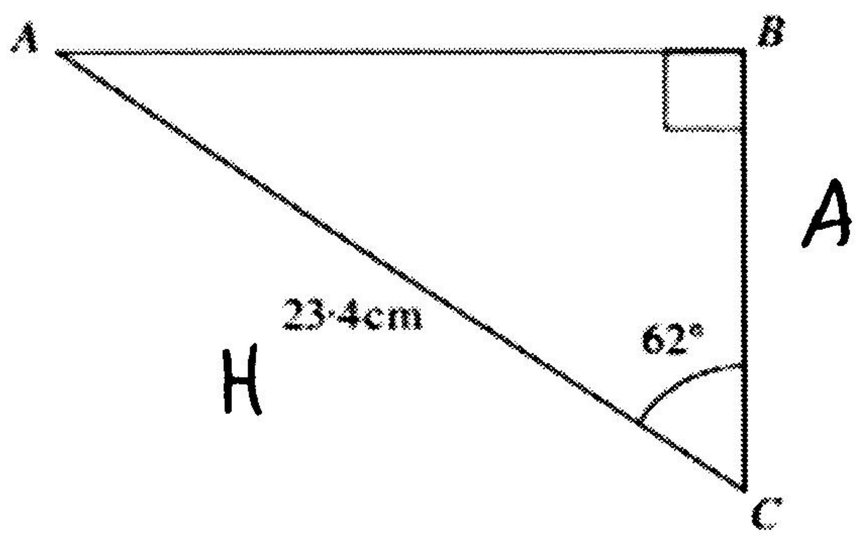


Diagram not drawn to scale.

ABC is a right-angled triangle with $AC = 23{\cdot}4$ cm and $\hat{ACB} = 62°$. Calculate the length of BC.

$\cos 62° = \frac{A}{23.4}$ (1) $A = 23.4 \times \cos 62°$ (1)

$A = 10.98\text{cm}$ (1)

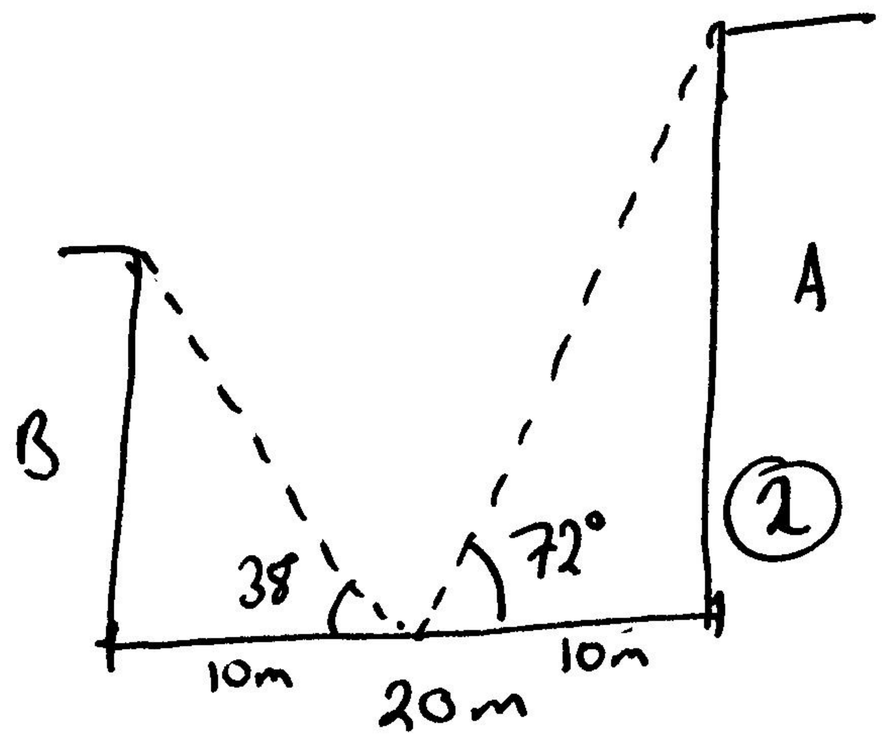
[3]

11. City planners need to know the difference in height between a building on one side of a road and a building on the other side of the road.
The buildings are vertical and directly opposite each other.

The horizontal road is 20 m wide.
From the centre of the road between the buildings, the angle of elevation of
- the top of the building on one side is 72°,
- the top of the building on the other side is 38°.

Calculate the difference in the heights of the buildings.

Space for diagram.



Building A. $10 \times \tan 72° = H_A$

$H_A = 30.77\text{m}$ (1)

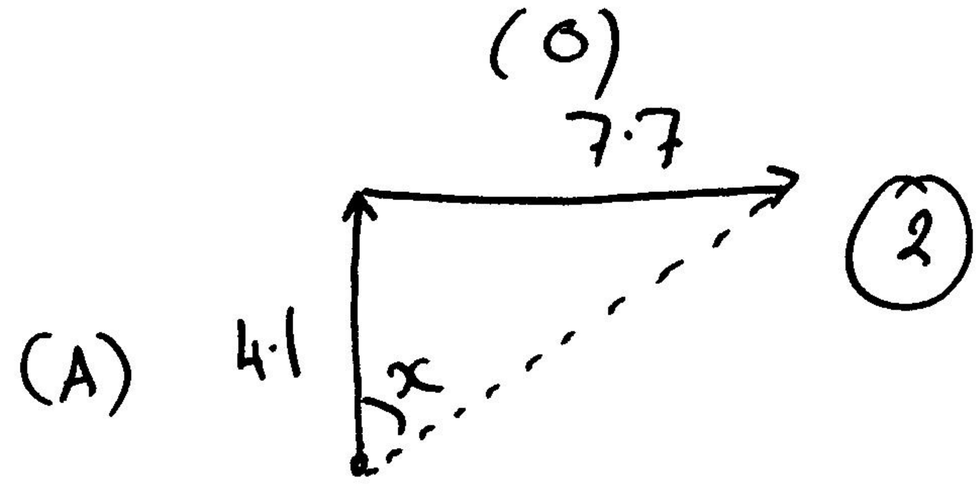
Building B $10 \times \tan 38° = H_B$

$H_B = 7.81\text{m}$ (1)

$\therefore$ Difference is $= 22.96\text{m}$ (1)

[5]

13. *(a)* From a harbour a yacht sails 4·1 km North.
It then sails 7·7 km East before dropping the anchor.
Calculate the bearing of the yacht from the harbour.



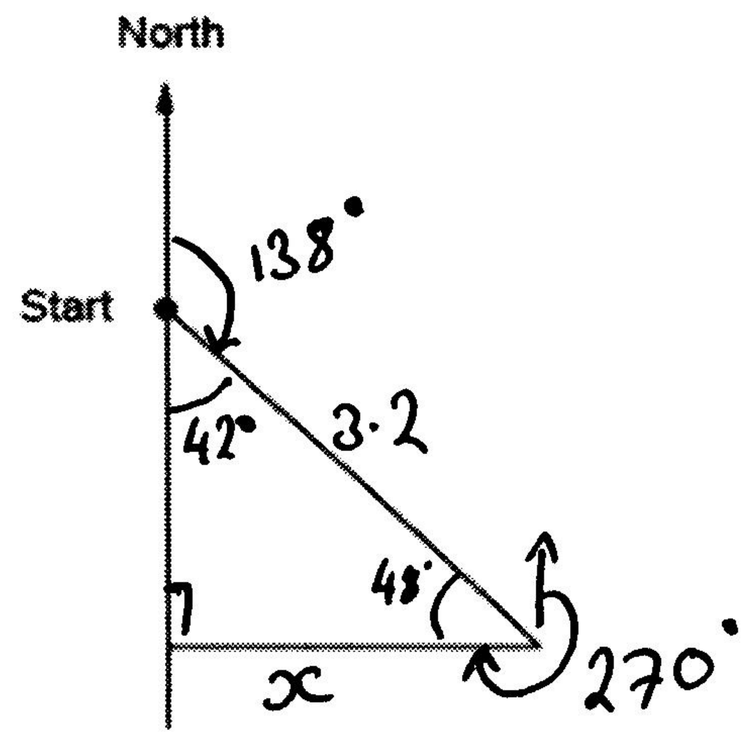
$\tan x = \frac{7.7}{4.1}$ (1)

$\tan^{-1}(1.87804878) = x$ (1)

$x = 61.9°$ (1)

[5]

12. A yacht sails on a bearing of 138° for 3·2 km.
The yacht then turns to sail on a bearing of 270°.
Calculate the distance the yacht sails in this direction until it is due South of its starting position.
[4]



2

Diagram not drawn to scale

$\cos 48^\circ = \frac{x}{3.2}$

$3.2 \times \cos 48^\circ = x$ (1)

$\therefore x = 2.14\text{ km}$ (1)