Class 10-Mathematics

Instructions for students: The notes provided must be copied to the Maths copy and then do the homework in the same copy.

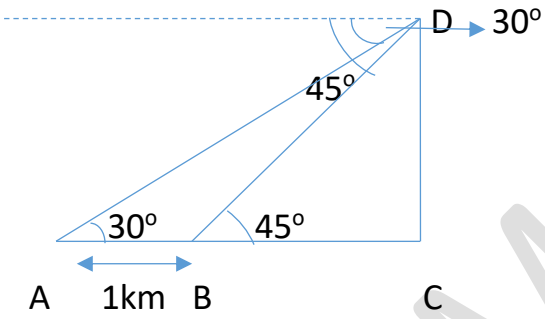
Chapter 20

Heights and Distances

Exercise 20(Continued)

Question 19

Solution:



Let A and B be the two kilometre stones and C be the foot of the hill.

Distance between A and B = 1 km

In ΔBCD, $\tan 45^\circ = \frac{DC}{BC}$

$1 = \frac{DC}{BC} \Rightarrow BC = DC$ ……(1)

In ΔACD, $\tan 30^\circ = \frac{DC}{AC}$

$\frac{1}{\sqrt{3}} = \frac{BC}{BC+1}$ (From (1) and from figure)

$BC+1 = BC\sqrt{3}$

$BC\sqrt{3} - BC = 1$

$BC(\sqrt{3} - 1) = 1$

$BC = \frac{1}{\sqrt{3}-1} = \frac{1}{1.732-1} = \frac{1}{.732}$

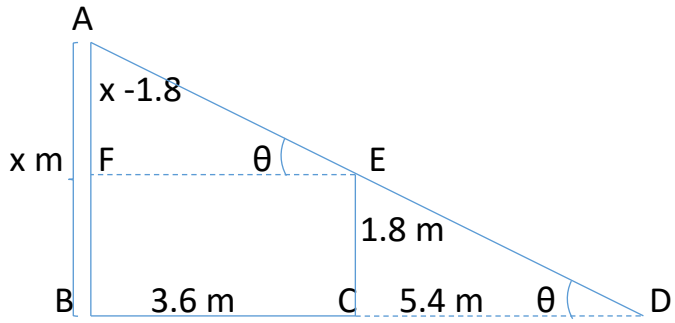
BC = 1.366 km

AC = 1.366+1 = 2.366 km

Distance of stones from foot of the hill = 1.366 km and 2.366 km

Question 31

Solution:



Let the height of the lamp post be x m.

The angle of elevation of the lamp post from the man's eye and from the ground at the end of the shadow are same. Let it be θ.

In ΔAFE, $\tan\theta = \frac{AF}{FE}$

$\tan\theta = \frac{x-1.8}{3.6}$ ------(1)

In ΔDCE, $\tan\theta = \frac{CE}{CD}$

$\tan\theta = \frac{1.8}{5.4}$ -------(2)

From (1) and (2),

$\frac{x-1.8}{3.6} = \frac{1.8}{5.4}$

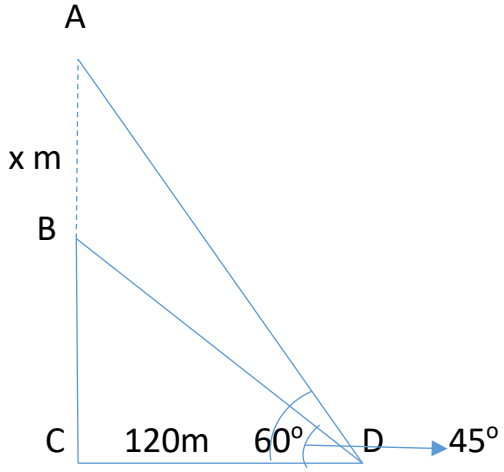
$x - 1.8 = \frac{1.8\times3.6}{5.4}$

$x = 1.2 + 1.8$

$= 3$ m

Question 36:

Solution:



Let the height to be raised be x m.

In ΔBCD, $\tan 45^\circ = \frac{BC}{CD}$

$1 = \frac{BC}{120}$

$BC = 120$ m

In ΔACD, $\tan 60^\circ = \frac{AC}{CD}$

$\sqrt{3} = \frac{x+120}{120}$

$120\sqrt{3} = x + 120$

$x = 120\sqrt{3} - 120$

$x = 120(\sqrt{3} - 1)$

$= 120 \times .732 = 87.84$ m

Home Work:

- Solve **Exercise 20 Questions 20, 21, 23, 26, 27, 32** in the Maths copy.
- Practise **exercise 20 all problems.**