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

<u>Angle of elevation :</u> When an observer looks at an object that is above his eye level, the angle between horizontal and the line of sight is called the angle of elevation.

Angle of depression :: When an observer looks at an object that is below his eye level, the angle between of horizontal and the line of sight is called the angle of depression.

Exercise 20

4. Solution

Vertical pole(x)

Shadow(x)

θ

Let the height of the pole and length of the shadow be x m each and $\boldsymbol{\theta}$ be the angle of elevation.



7. Solution:





Let AB = 92 m be the height of the cliff and BC be the distance of buoy from the foot of the cliff.



Let AB be the actual height of the tree, BD be the height at which the tree is broken and BC be the distance between the foot of the tree and the point at which the broken part touches the ground.

	BC	=	6 m	
In ∆D	BC,			
	tan 38º 30'	=	BD BC	
	.7954	=	$\frac{BD}{6}$	[tan 38° 30'=.7954]
	BD	=	6×.7954	
		=	4.77 m	ı



Let AC be the height of the tower , CD and CE be the length of the shadow when the altitude of sun is 30^o and 45^o respectively.

CE =	CD+10		
In ΔACD, tan 45°		=	AC CD
	1	=	AC CD
	AC	=	CD
In ΔACE, tan 30°		=	$\frac{AC}{CE}$
	$\frac{1}{\sqrt{3}}$	=	$\frac{AC}{CE}$
	$\frac{1}{\sqrt{3}}$	=	$\frac{CD}{CD+10}$

CD+10	=	$CD\sqrt{3}$	
$CD\sqrt{3} - CD$	=	10	
$CD(\sqrt{3}-1)$	=	10	
CD	=	$\frac{10}{\sqrt{3}-1}$ =	$\frac{10}{1.732-1}$
	=	$\frac{10}{0.732}$ =	13.66 m
Height of the tower	=	13.66 m	

Home Work:

- Solve Exercise 20 Questions 3, 6, 8, 10, 13, 14, 16 and 17 in the Maths copy.
- Practise **exercise 20**