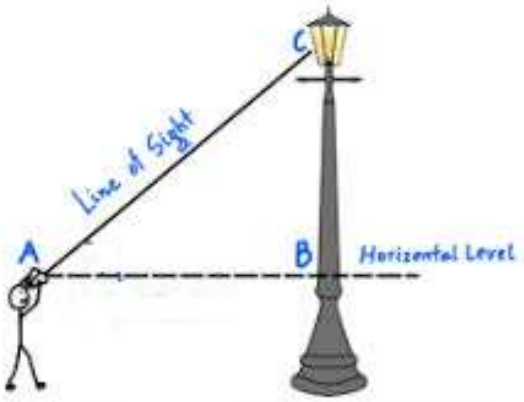
Chapter- 9

Some Applications of Trigonometry

STUDY NOTES

Horizontal Level and Line of Sight

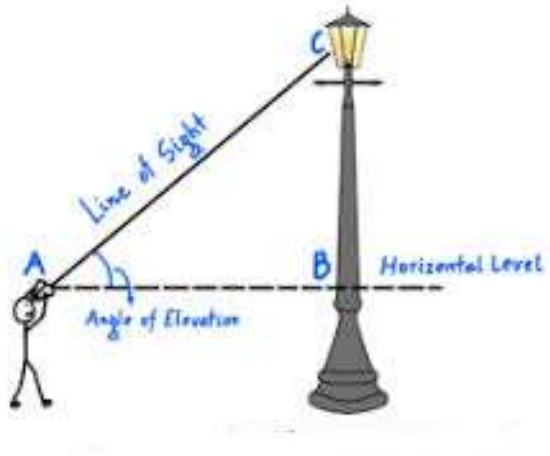


Line of sight is the line drawn from the eye of the observer to the point on the object viewed by the observer.

Horizontal level is the horizontal line through the eye of the observer.

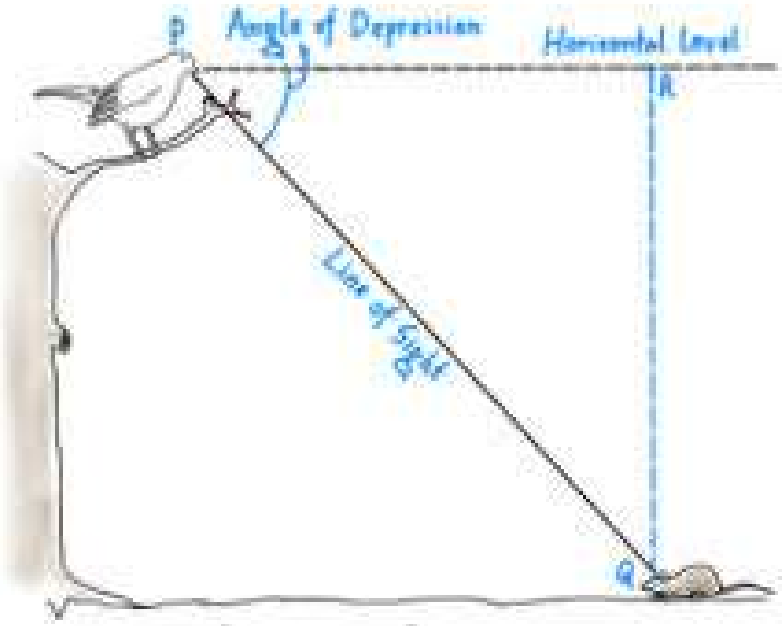
Angle of elevation

The **angle of elevation** is relevant for objects above horizontal level.
It is the **angle** formed by the **line of sight** with the **horizontal level**.



Angle of depression

The **angle of depression** is relevant for objects below horizontal level.
It is the **angle** formed by the **line of sight** with the **horizontal level**.



Calculating Heights and Distances

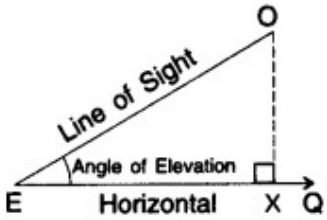
To, calculate heights and distances, we can make use of trigonometric ratios.

Step 1: Draw a **line diagram** corresponding to the problem.

Step 2: Mark all known heights, distances and angles and denote unknown lengths by variables.

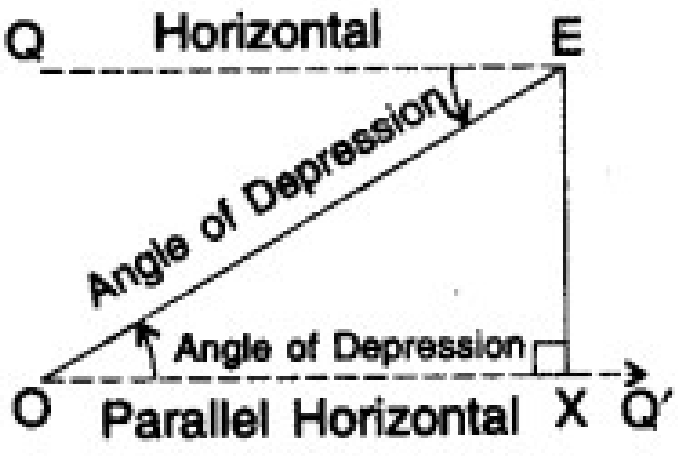
Step 3: Use the values of various **trigonometric ratios** of the angles to obtain the unknown lengths from the known lengths.

Case I: Angle of Elevation is known
Draw OX perpendicular to EQ.
Now ∠OXE = 90°
ΔOXE is a rt. Δ, where
OE = hypotenuse
OX = opposite side (Perpendicular)
EX = adjacent side (Base)



Case II: Angle of Depression is known
(i) Draw OQ'parallel to EQ

(ii) Draw perpendicular EX on OQ'.
(iii) Now ∠QEO = ∠EOX = Interior alternate angles
ΔEXO is an rt. Δ. where
EO = hypotenuse
OX = adjacent side (base)
EX = opposite side (Perpendicular)



- Choose a trigonometric ratio in such a way that it considers the known side and the side that you wish to calculate.
- The eye is always considered at ground level unless the problem specifically gives the height of the observer.

The object is always considered as a point.
Some **P**eople **H**ave
Sin θ = Perpendicular/Hypotenuse
Curly **B**lack **H**air
Cos θ = Base/Hypotenuse
Turn **P**ermanent **B**lack.
Tan θ = Perpendicular/Base

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