Some Applications of Trigonometry

Draw the horizontal ground, the vertical height and the line of sight before writing a ratio. State whether the observer is at ground level.

Formulas and methods

tan θ = vertical difference/horizontal distance for an angle θ measured from the horizontal.

Angle of elevation looks upward from a horizontal line. Angle of depression looks downward; parallel horizontals make the corresponding elevation angle equal.

If the observer has eye height e and tan θ = h/d, the object height is H = e + h, assuming level ground.

Worked examples

From a point 20 m from a tower base, its top has elevation 30°. Find the tower height, ignoring eye height.

tan 30° = h/20 = 1/√3. Thus h = 20/√3 = 20√3/3 m, approximately 11.55 m.

A tower has elevation 30° from a point. After moving 20 m toward it, the elevation is 60°. Find its height.

Let the nearer distance be x m and height h m. Then h = x√3 and h = (x+20)/√3. Thus 3x = x+20, so x = 10 and h = 10√3 m. Both points are on the same side of the base.

Common mistake

Do not confuse the sloping line of sight with the horizontal distance. Add eye height only when the question supplies or requires it.

Some Applications of Trigonometry — practice

Try these without looking at the answers. Show substitutions and units. Difficulty labels describe these questions, not official CBSE classifications.

1. [Foundation] A pole is viewed at 45° from 12 m away on level ground. Ignore eye height. Find its height.

2. [Core] Find horizontal distance when a 15 m tower has elevation 60°.

3. [Core] An observer with eye height 1.6 m stands 10 m from a pole and sees its top at 45°. Find the pole height.

4. [Challenge] A 30 m tower casts a shadow of length $10\sqrt{3}$ m. Find the sun elevation.

Some Applications of Trigonometry — answers

1. A pole is viewed at 45° from 12 m away on level ground. Ignore eye height. Find its height.

tan 45° = h/12 = 1, so h = 12 m.

2. Find horizontal distance when a 15 m tower has elevation 60°.

d = 15/√3 = 5√3 m.

3. An observer with eye height 1.6 m stands 10 m from a pole and sees its top at 45°. Find the pole height.

Height above eye = 10 tan 45° = 10 m. Total = 11.6 m.

4. A 30 m tower casts a shadow of length 10√3 m. Find the sun elevation.

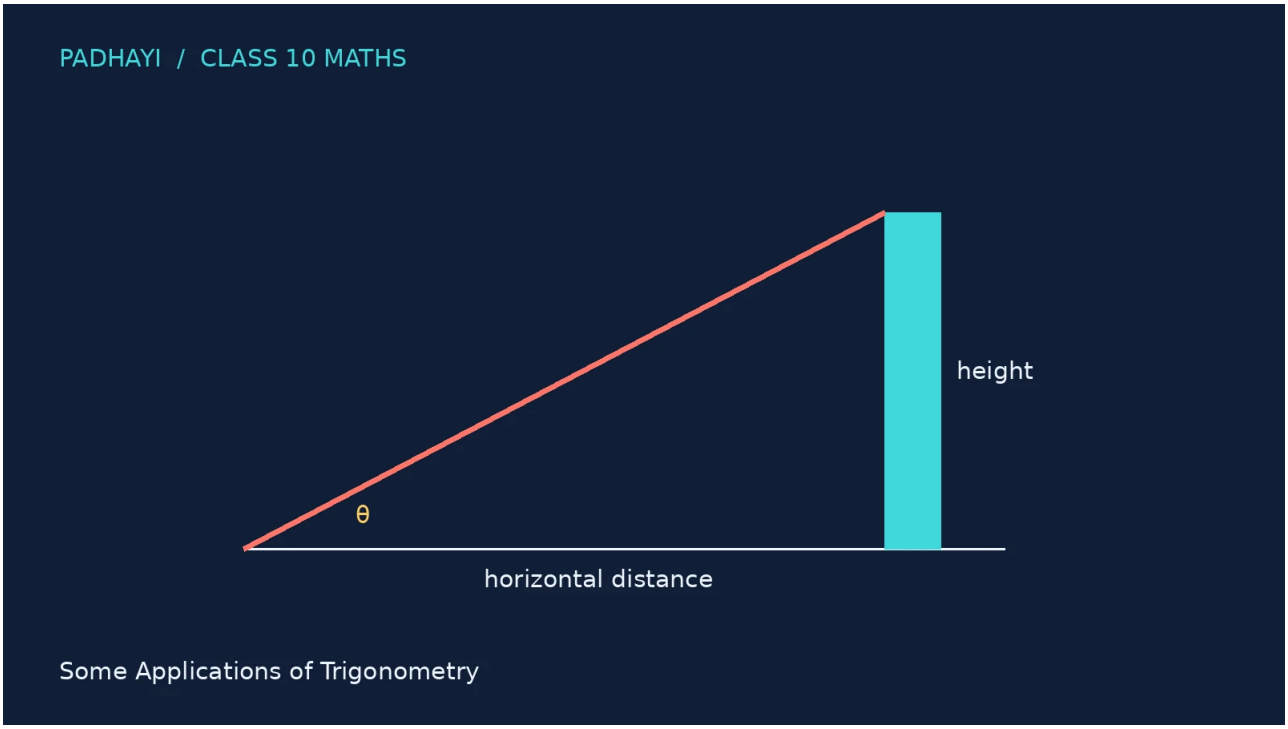
tan θ = 30/(10√3) = √3, so θ = 60°.

Next step: explain one method aloud, then solve a question from your NCERT textbook without using this sheet.

Original Padhayi revision material. Independent study aid; not an official CBSE or NCERT publication. Syllabus reference: CBSE Mathematics, Class X, 2026–27.

Official CBSE syllabus | NCERT textbooks

Visual reminder



Schematic illustration; diagrams are not necessarily drawn to scale.