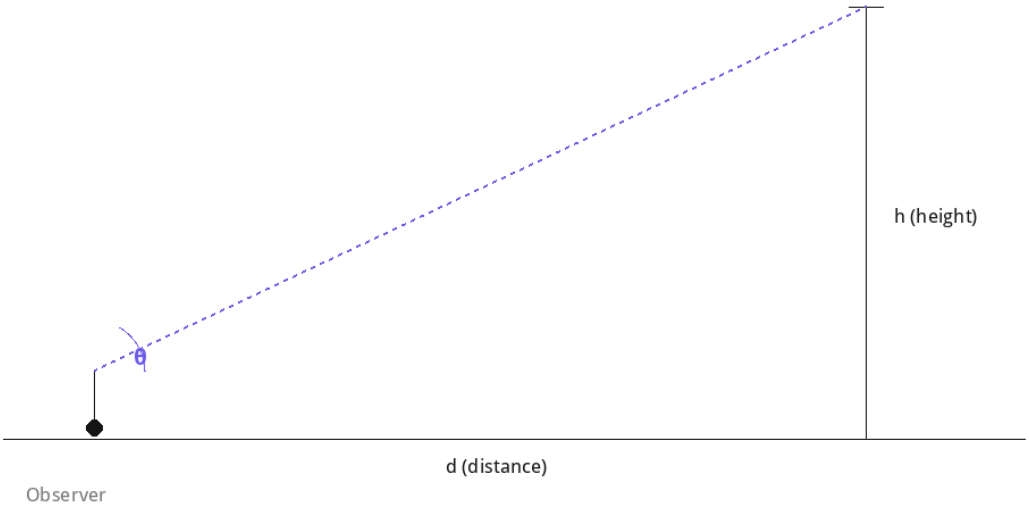
CLASS 10 MATHS NCERT SOLUTIONS

NCERT Solutions for Class 10 Maths Chapter 9: Some Applications of Trigonometry – Free PDF Download

Chapter 9 of Class 10 Maths applies the trigonometric ratios learned in Chapter 8 to real-life problems of heights and distances. In the current 2026-27 rationalised syllabus, this chapter has a single exercise, Exercise 9.1, with 16 questions. Every solution below is worked from first principles using the standard ...

Contents



Reference figure — angle of elevation, height and distance

Class 10 Maths Chapter 9 – Some Applications of Trigonometry: NCERT Solutions

Chapter 9 of Class 10 Maths applies the trigonometric ratios learned in Chapter 8 to real-life problems of heights and distances. In the current 2026-27 rationalised syllabus, this chapter has a single exercise, **Exercise 9.1**, with 16 questions. Every solution below is worked from first principles using the standard trigonometric ratio values.

Why this chapter matters for boards

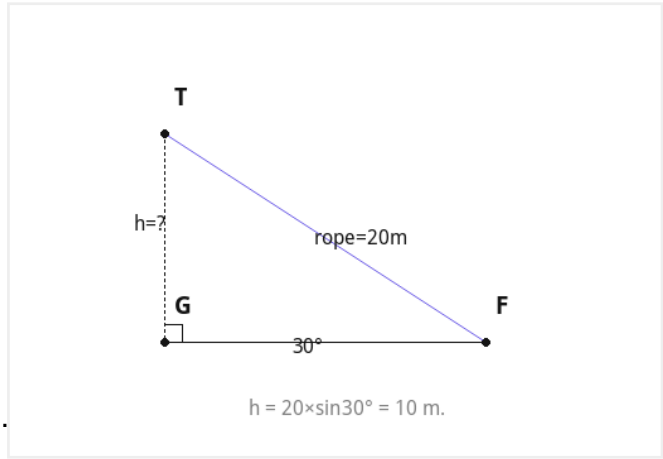
Height-and-distance problems are a guaranteed 3-5 mark question in every CBSE Class 10 Maths board paper. They test whether a student can correctly translate a word problem into a right triangle, identify the angle of elevation/depression, and apply the correct trig ratio. Diagrams and clean step-by-step working earn method marks even if the final answer has a small arithmetic slip.

Key idea before you start

Angle of elevation is measured upward from the horizontal to the line of sight; angle of depression is measured downward. In every problem here, draw the right triangle first, mark the known side and angle, then choose tan, sin, or cos based on which two sides are involved.

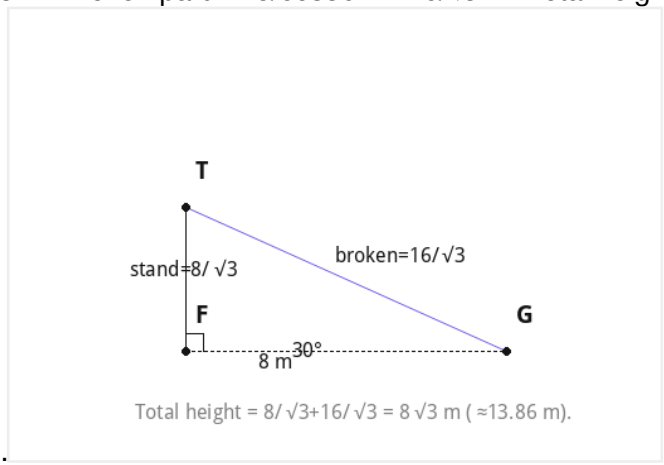
Exercise 9.1 Solutions

Q1. A circus artist climbs a 20 m rope tied from the top of a vertical pole to the ground, making a 30° angle with the ground. Find the height of the pole.



Height = 20 × sin30° = 20 × 1/2 = **10 m**.

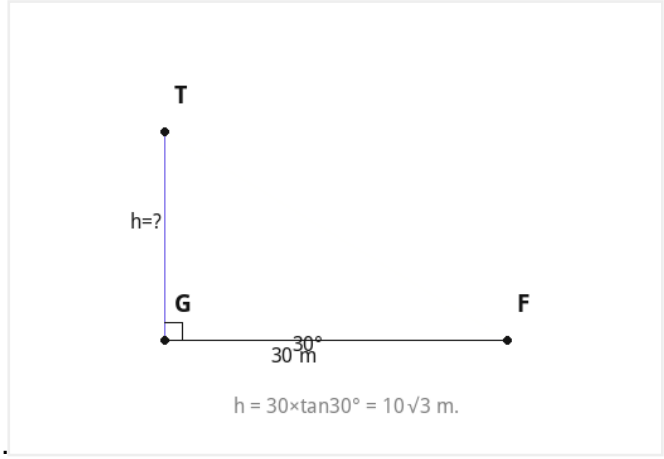
Q2. A tree breaks in a storm; the broken top touches the ground 8 m from the foot, making a 30° angle with the ground. Find the height of the tree.
Standing part h = 8 tan30° = 8/√3 m. Broken part l = 8/cos30° = 16/√3 m. Total height = 8/√3 + 16/√3 =



24/√3 = **8√3 m** (approx 13.86 m).

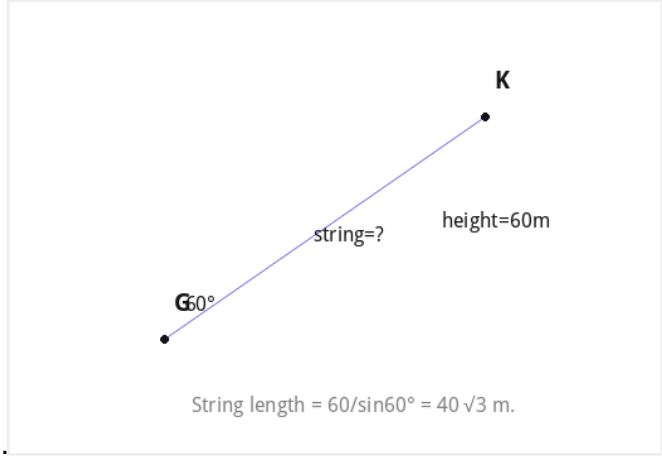
Q3. Two slides: one 1.5 m high at 30°, one 3 m high at 60°. Find each slide length.
Slide 1: length = 1.5/sin30° = **3 m**. Slide 2: length = 3/sin60° = 6/√3 = **2√3 m**.

Q4. A point on the ground is 30 m from a tower's foot; angle of elevation of the top is 30°. Find the tower's height.



Height = 30 tan30° = 30/√3 = **10√3 m**.

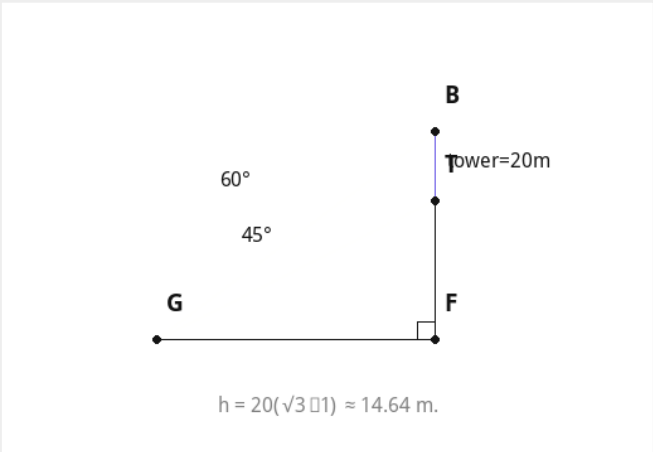
Q5. A kite flies at 60 m height; the string makes a 60° angle with the ground. Find the string length.



Length = 60/sin60° = 120/√3 = **40√3 m**.

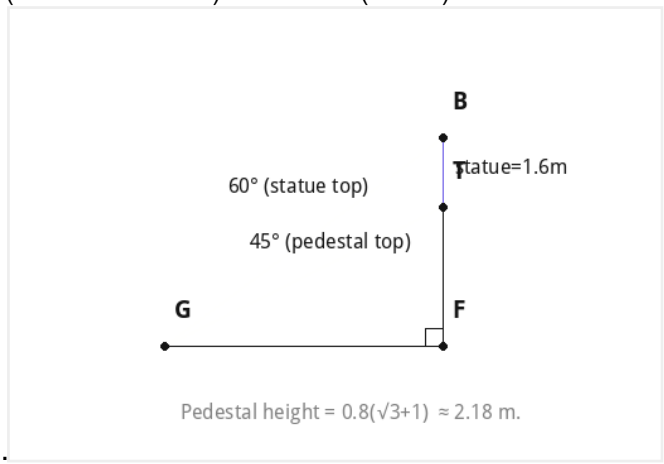
Q6. A 1.5 m boy watches a 30 m building; elevation increases from 30° to 60° as he walks closer. Find the distance walked.
Height above eye level = 28.5 m. d1 = 28.5/tan30° = 28.5√3. d2 = 28.5/tan60° = 28.5/√3. Distance walked = 28.5√3 – 28.5/√3 = **19√3 m** (approx 32.9 m).

Q7. From a point on the ground, angles of elevation of the bottom and top of a 20 m tall transmission tower fixed atop a building are 45° and 60°. Find the tower's (aerial's) height.
Distance from point d = 20/tan45° = 20 m. tan60° = (20+h)/20 => 20√3 = 20+h => **h = 20(√3 – 1) m**



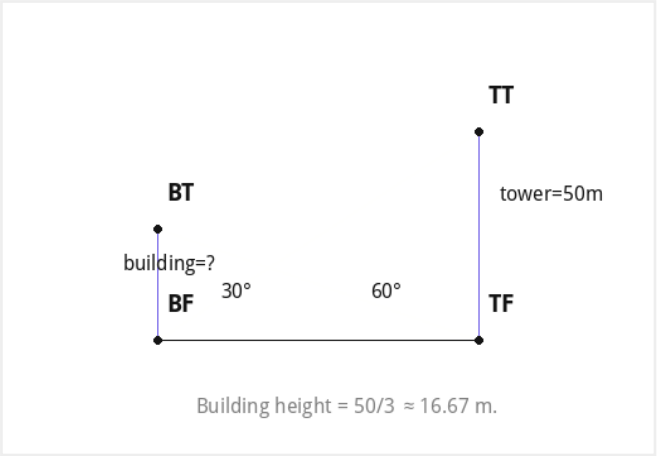
(approx 14.64 m).

Q8. A 1.6 m statue stands on a pedestal; elevation of statue-top is 60°, of pedestal-top is 45°, from the same point. Find pedestal height.
Let pedestal height h, distance d = h (since tan45°=1). tan60° = (h+1.6)/h => √3h = h+1.6 => h(√3-1) = 1.6

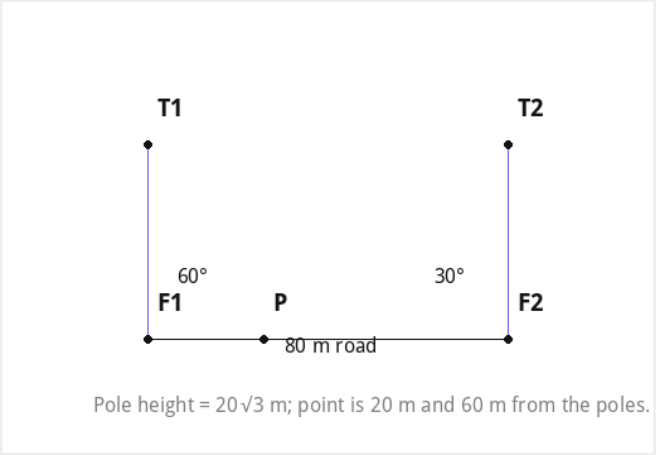


=> **h = 0.8(√3+1) m** (approx 2.18 m).

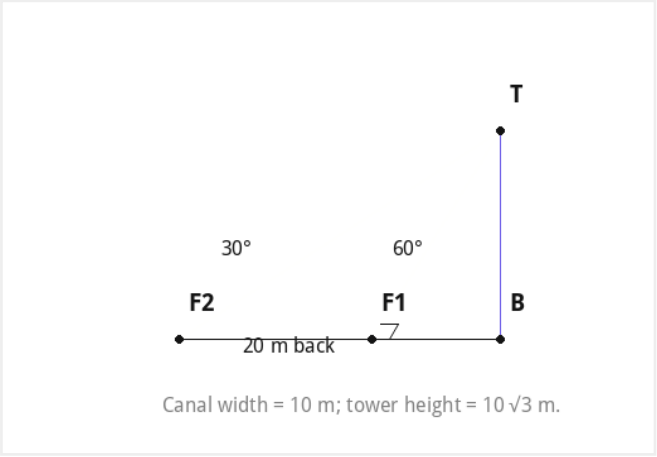
Q9. Elevation of a building's top from a tower's foot is 30°; elevation of the 50 m tower's top from the building's foot is 60°. Find the building's height.
Distance d = 50/tan60° = 50/√3. Building height = d tan30° = (50/√3)(1/√3) = **50/3 m** (approx 16.67 m).



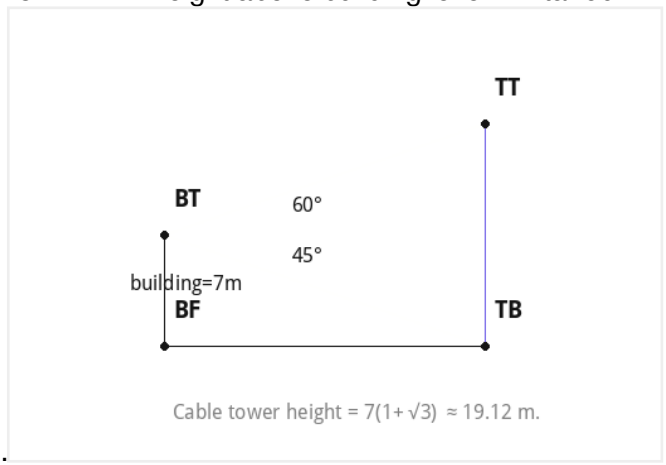
Q10. Two equal poles stand on either side of an 80 m wide road; from a point between them, elevations are 60° and 30°. Find pole height and distances from each pole.
Let distances x and 80-x. x√3 = (80-x)/√3 => 3x = 80-x => x = 20. Height = **20√3 m**; distances **20 m and 60 m**.



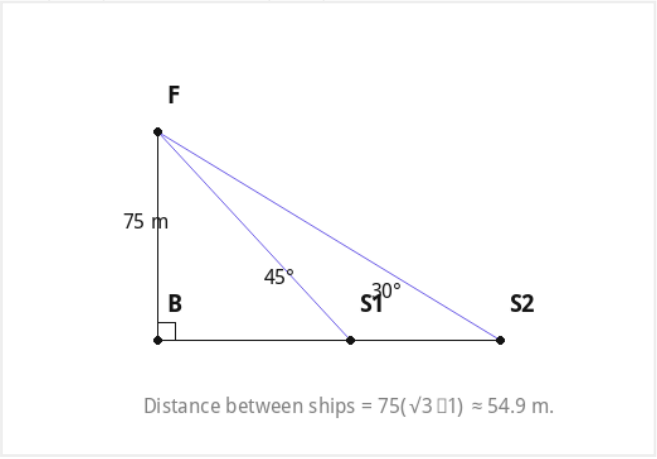
Q11. From one bank of a canal, elevation of a TV tower on the other bank is 60°; 20 m further back, elevation is 30°. Find the tower height and canal width.
Width d: d√3 = (d+20)/√3 => 3d = d+20 => d = 10. Width = **10 m**, height = **10√3 m**.



Q12. From atop a 7 m building, elevation of a cable tower's top is 60° and depression of its foot is 45°. Find the tower's height.
Horizontal distance d = 7/tan45° = 7 m. Height above building level = 7 tan60° = 7√3. Total tower height = **7(1+√3) m** (approx 19.12 m).



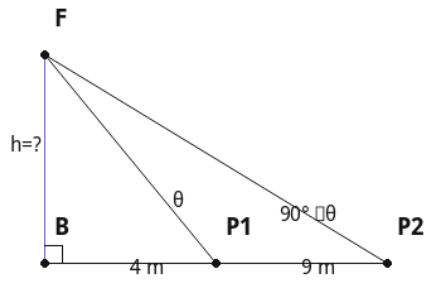
Q13. From a 75 m lighthouse, angles of depression of two ships (in line, same side) are 30° and 45°. Find the distance between them.
d1 (45°) = 75 m. d2 (30°) = 75√3 m. Distance = **75(√3-1) m** (approx 54.9 m).



Q14. A 1.2 m girl watches a balloon at 88.2 m height; elevation reduces from 60° to 30°. Find the distance travelled by the balloon.
Height above eye = 87 m. d1 = 87/√3 = 29√3. d2 = 87√3. Distance = 87√3-29√3 = **58√3 m** (approx 100.4 m).

Q15. From a tower, a car's angle of depression changes from 30° to 60° in 6 seconds as it approaches. Find the further time to reach the tower's foot.
Let height h. d1 = h√3, d2 = h/√3. Distance covered in 6s = 2h/√3, speed = h/(3√3) per second. Remaining distance d2 = h/√3, time = d2/speed = **3 seconds**.

Q16. From two points 4 m and 9 m from a tower's base (same line), the elevations are complementary. Prove the tower's height is 6 m.
tanθ = h/4 and tan(90-θ) = h/9, so tanθ × cotθ = 1 = h^2/36, giving h^2 = 36, h = **6 m**. Proved.



$\tan\theta \cdot \cot\theta = 1 \rightarrow h^2 = 4 \times 9 = 36 \rightarrow h = 6$ m.

CBSE Exam Weightage

This chapter falls under **Unit V: Trigonometry** in the CBSE Class 10 Maths board exam syllabus. This unit typically carries around **12 marks (15%)** of the 80-mark theory paper, based on CBSE's published unit-wise weightage (Question Paper Design). CBSE sets weightage at the unit level rather than chapter-by-chapter, so the exact share from this specific chapter can vary a little between years and sample papers.

Class 10 Mathematics Chapter 9 – Notes and Extra Questions

Along with these NCERT Solutions, students can also use the Class 10 Mathematics Chapter 9 Extra Questions and Class 10 Mathematics Chapter 9 Revision Notes for quick revision and extra practice.