

Maxprap. Chapter wise Series Class 10th – Mathematics

Class : 10th

Topic : Application to Trigonometry

Max. Marks : 50

Duration : 2 Hrs

Sections: A (MCQs), B (Short Answer-I), C (Short Answer-II), D (Long Answer), E (Case-Based).

General Instructions:

- (i). All questions are compulsory.
- (ii). This question paper contains 23 questions divided into five Sections A, B, C, D and E. (iii). Section A comprises of 10 MCQs of 1 mark each. Section B comprises of 5 questions of 2 marks each. Section C comprises of 4 questions of 3 marks each. Section D comprises of 2 question of 5 marks each and Section E comprises of 2 Case Study Based Questions of 4 marks each.
- (iv). There is no overall choice.
- (v). Use of Calculators is not permitted.
- (vi). Draw neat figures wherever required. Take $\pi = 22/7$, wherever required if not stated.

Section A

Questions 1 to 10 carry 1 mark each

1. The ratio between the height and the length of the shadow of a pole is $1:\sqrt{3}$, then the sun's altitude is
a) 60° b) 75° c) 45° d) 30°
2. The angle of elevation of the top of a tower at a point on the ground 50 m away from the foot of the tower is 45° . Then the height of the tower (in metres) is
a) $\frac{50}{\sqrt{2}}$ b) $50\sqrt{3}$ c) 50 d) $\frac{50}{\sqrt{3}}$
3. A ladder 12 m long just reaches the top of a vertical wall. If the ladder makes an angle of 45° with the wall, then the height of the wall is
a) $12\sqrt{2}m$ b) $6\sqrt{2}m$ c) 12 m d) 6 m
4. The length of shadow of a tower on the plane ground is $\sqrt{3}$ times the height of the tower. The angle of elevation of sun is
a) 30° b) 45° c) 90° d) 60°
5. The tops of two poles of height 16 m and 10 m are connected by a wire of length/meters. If the wire makes an angle of 30° with the horizontal, then l =
a) 10 b) 26 c) 12 d) 16
6. If the altitude of the sun is 60° , the height of a tower which casts a shadow of length 90 m is
a) 60 m b) $60\sqrt{3}$ m c) 90 m d) $90\sqrt{3}$ m

7. From the top of a cliff 25 m high the angle of elevation of a tower is found to be equal to the angle of depression of the foot of the tower. The height of the tower is
 a) 25 m b) 100 m c) 50 m d) 75 m
8. If the elevation of the sun changes from 30° to 60° then the difference between the lengths of shadows of a pole 15 m high, is
 a) $10\sqrt{3}$ m b) 15 m c) $5\sqrt{3}$ m d) 7.5 m

Assertion(A)/Reason(R) Based (9-10): In the following questions, a statement of assertion (A) is followed by a statement of Reason (R). Choose the correct answer out of the following choices.

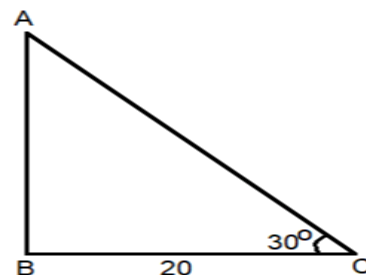
- a) Both A and R are true and R is the correct explanation of A.
 b) Both A and R are true but R is not the correct explanation of A.
 c) A is true but R is false.
 d) A is false but R is true.

9. Assertion (A): If the length of the shadow of a vertical pole is equal to its height, then the angle of elevation of the sun is 45° .

Reason (R): According to Pythagoras theorem, $h^2 = l^2 + b^2$ where h = hypotenuse, l = length and b = base.

10. Assertion (A): In the given fig if $BC = 20$ m then height AB is also 20 m

Reason (R): $\tan \theta = \frac{AB}{BC}$, where θ is angle $\angle ACB$



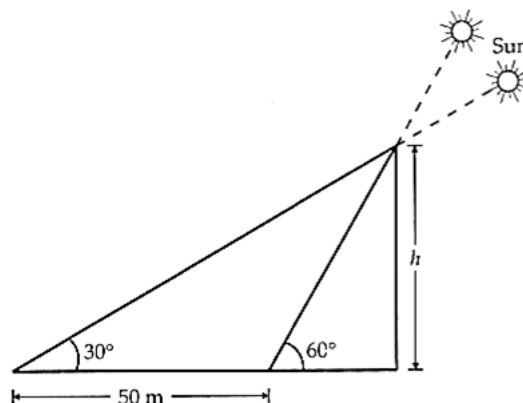
SECTION – B

Questions 11 to 15 carry 2 marks each

11. A vertical pole stands on the level ground. From a point on the ground, 25 m away from the foot of the pole, the angle of elevation of its top is found to be 60° . Find the height of the pole. [Take $\sqrt{3} = 1.732$.]

12. A man standing on the deck of a ship, which is 10 m above the water level, observes the angle of elevation of the top of a hill as 60° and the angle of depression of the base of the hill as 30° . Calculate the distance of the hill from the ship and the height of the hill.

13. The shadow of a tower standing on a level plane is found to be 50 m longer when sun's altitude is 30° than when it is 60° . Find the height of the tower.



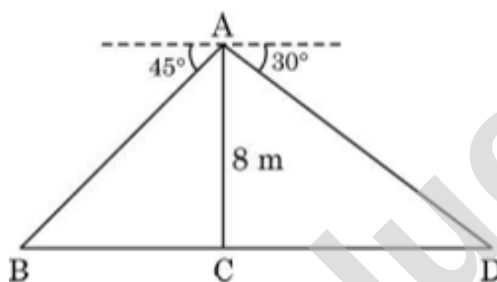
14. A tree breaks due to storm and the broken part bends so that the top of the tree touches the ground making an angle 30° with it. The distance between the foot of the tree to the point where the top touches the ground is 8 m. Find the height of the tree.

15. A straight highway leads to the foot of a tower. A man standing on its top observes a car at an angle of depression of 30° , which is approaching the foot of the tower with a uniform speed. 6 seconds later, the angle of depression of the car becomes 60° . Find the time taken by the car to reach the foot of tower from this point.

SECTION – C

Questions 16 to 19 carry 3 marks each

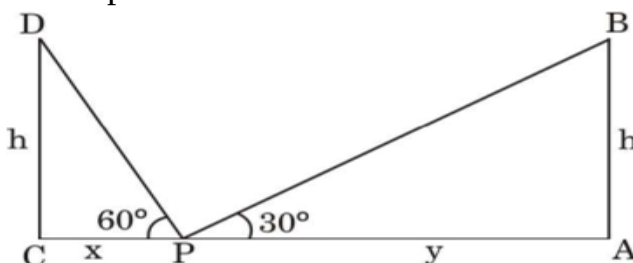
16. From a point on a bridge across a river, the angles of depression of the banks on opposite sides of the river are 30° and 45° . If the bridge is at a height of 8 m from the banks, then find the width of the river.



17. The shadow of a tower standing on a level ground is found to be 40 m longer when the Sun's altitude is 30° , than when it is 60° . Find the height of the tower.

18. As observed from the top of a 150 m tall light house, the angles of depression of two ships approaching it are 30° and 45° . If one ship is directly behind the other, find the distance between the two ships.

19. Two poles of equal heights are standing opposite each other on either side of the road of width 60 m. From a point P between them on the road, the angles of elevation of the top of the poles are 60° and 30° respectively, as shown in Figure. Find the height of the poles and distances of the point from the poles.



SECTION – D

Questions 20 to 21 carry 5 marks each

20. If the angle of elevation of a cloud from a point 10 meters above a lake is 30° and the angle of depression of its reflection in the lake is 60° , find the height of the cloud from the surface of lake.

21. The angles of depression of the top and bottom of an 8 m tall building from top of a multi-storeyed building are 30° and 45° , respectively. Find the height of multi - storeyed building and distance between two buildings.

SECTION – E (Case Study Based Questions)

Questions 22 & 23 carry 4 marks each

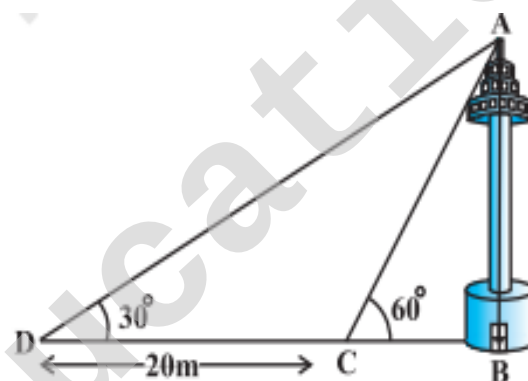
Read the following text carefully and answer the questions that follow:

22. A TV tower stands vertically on a bank of a canal. From a point on the other bank of a canal. From a point on the other bank directly opposite the tower, the angle of elevation of the top of the tower is 60° from a point 20 m away from this point on the same bank the angle of elevation of the top of the tower is 30° .

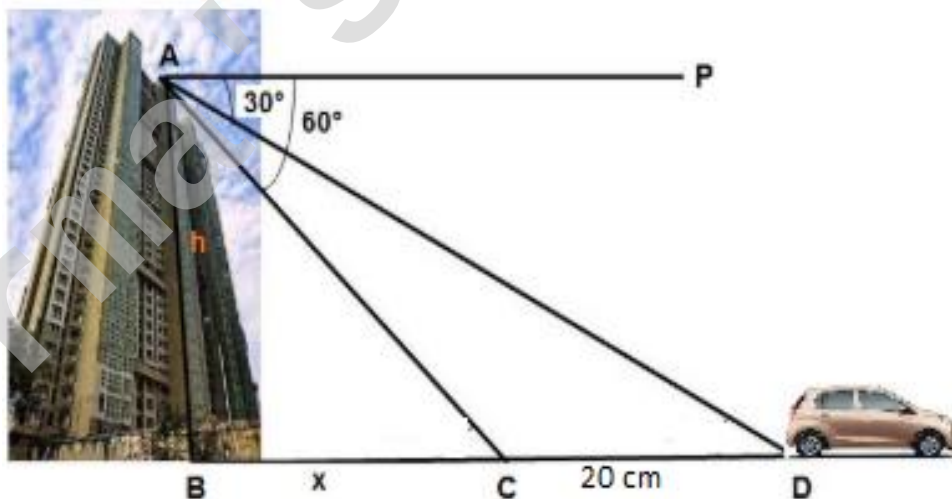
- Find the width of the canal. (1)
- Find the height of tower. (1)
- Find the distance between top of the tower and point D. (2)

OR

Find the distance between top of tower and point C. (2)



23. Vijay lives in a flat in a multi - story building. Initially, his driving was rough so his father keeps eye on his driving. Once he drives from his house to Faridabad. His father was standing on the top of the building at point A as shown in the figure. At point C, the angle of depression of a car from the building was 60° . After accelerating 20 m from point C, Vijay stops at point D to buy ice - cream and the angle of depression changed to 30° .



By analysing the above given situation answer the following questions:

- Find the value of x.
- Find the height of the building AB.

Application to Trigonometry Paper Details – Analysis		
Objective Questions		
MCQ	1 marks x 8 question = 8	
Assertion Reason	1 marks x 2 question = 2	
Subjective		
Short type I	2 marks x 5 question = 10	
Short type II	3 marks x 4 question = 12	
Long Type	5 marks x 2 question = 10	
Case Studies Based		
Case 1	4 marks	
Case 2	4 marks	

Total = 50 marks Your Score =