



MATHS

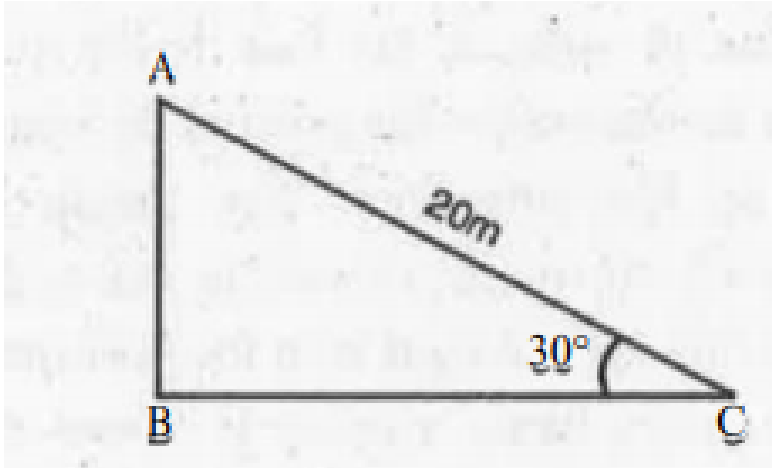
BOOKS - PSEB

SOME APPLICATIONS OF TRIGONOMETRY

Exercise

1. A circus artist is climbing a 20m long rope, which is tightly stretched and tied from the

top of a vertical pole to the ground. Find the height of the pole, if the angle made by the rope with the ground level is 30° (see fig.).



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2. 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.



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3. A contractor plants to install two slides for the children to play in a park. For the children below the age of 5 years, she prefers to have a slide whose top is at a height of 1.5 m, and is inclined at an angle of 30° to the ground,

whereas for elder children, she wants to have a steep slide at a height of 3 m, and inclined at an angle of 60° to the ground. What should be the length of the slide in each case ?



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4. The angle of elevation of the top of a tower from a point on the ground, which is 30 m away from the foot of the tower, is 30° . Find the height of the tower.



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5. A kite is flying at a height of 60 m above the ground. The string attached to the kite is temporarily tied to a point on the ground. The inclination of the string with the ground is 60° . Find the length of the string, assuming that there is no slack in the string



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6. A 1.5 m tall boy is standing at some distance from a 30 m tall building. The angle of

elevation from his eyes to the top of the building increases from 30° to 60° as he walks towards the building. Find the distance he walked towards the building.



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7. From a point on the ground, the angles of elevation of the bottom and top of a transmission tower fixed at the top of a 20 m high building are 45° and 60° respectively. Find the height of the tower.



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8. A statue 1.6 m tall stands on the top of a pedestal. From a point on the ground, the angle of elevation of the top of the statue is 60° and from the same point the angle of elevation of the top of the pedestal is 45° . Find the height of the pedestal.



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9. The angle of elevation of the top of a building from the foot of the tower is 30° and the angle of elevation of the top of the tower from the foot of the building is 60° . If the tower is 50 m high, find the height of the building.



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10. Two poles of equal heights are standing opposite each other on either side of the road,

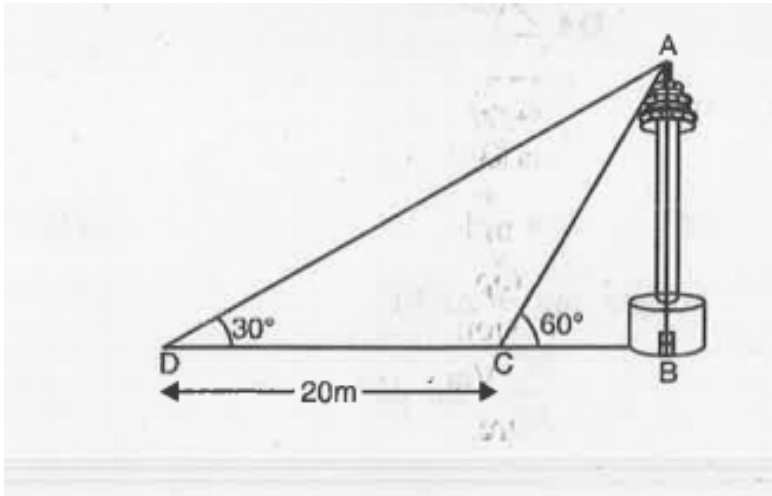
which is 80 m wide. From a point between them on the road the angles of elevation of the top of the poles are 60° and 30° , respectively. Find the height of the poles and the distances of the point from the poles.



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11. A TV tower stands vertically on a 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

20m away from this point on the same bank, the angle of elevation of the top of the tower is 30° (see fig.). Find the height of the tower and the width of the canal.



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12. From the top of a 7m high building, the angle of elevation of the top of a cable tower is 60° and the angle of depression of its foot is 45° . Determine the height of the tower.



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13. As observed from the top of a 75 m high lighthouse from the sea-level, the angles of depression of two ships are 30° and 45° . If one ship is exactly behind the other on the

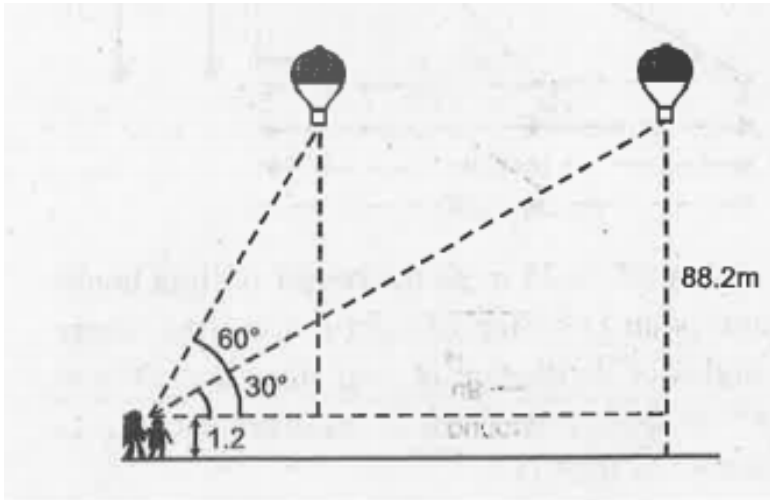
same side of the lighthouse, find the distance between the two ships.



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14. A 1.2 m tall girl spots a balloon moving with the wind in a horizontal line at a height of 88.2 m from the ground. The angle of elevation of the balloon from the eyes of the girl at any instant is 60° . After some time, the angle of elevation reduces to 30° (see fig.). Find the distance travelled by the balloon during the

interval.



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15. A straight highway leads to the foot of a tower. A man standing at the top of the tower observes a car at an angle of depression of 30° , which is approaching the foot of the

tower with a uniform speed. Six seconds later, the angle of depression of the car is found to be 60° . Find the further time taken by the car to reach the foot of the tower.



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16. The angles of elevation of the top of a tower from two points at a distance of 4 m and 9m from the base of the tower and in the same straight line with it are complementary. Prove that the height of the tower is 6 m.



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Example

1. A tower stands vertically on the ground. From a point on the ground, which is 15 m away from the foot of the tower, the angle of elevation of the top of the tower is found to be 60° . Find the height of the tower.



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2. An observer 1.5 m tall is 28.5 m away from a chimney. The angle of elevation of the top of the chimney from her eyes is 45° . What is the height of the chimney?



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3. From a point P on the ground the angle of elevation of the top of a 10 m tall building is 30° . A flag is hoisted at the top of the building and the angle of elevation of the top of the

flagstaff from P is 45° . Find the length of the flagstaff and the distance of the building from the point P. (You may take $\sqrt{3}=1.732$)



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4. 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



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



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6. 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° , respectively.

If the bridge is at a height of 3 m from the banks, find the width of the river.



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