

Based on the above information, answer the following question: 1

(i) Represent the information given above in terms of x and y . 2

(ii) Find the monthly fee paid by a poor child. 2

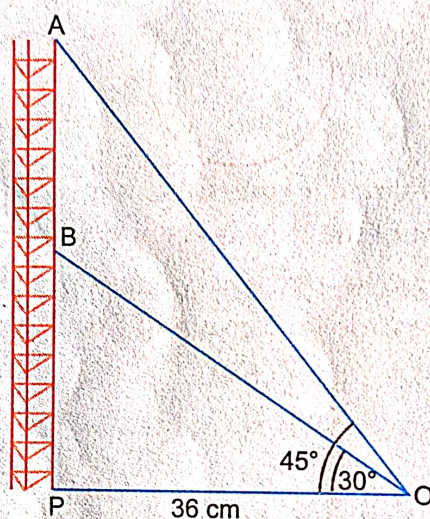
OR

Find the difference in the monthly fee paid by a poor child and a rich child. 2

(iii) If there are 10 poor and 20 rich children in batch II, what is the total monthly collection of fees from batch II? 1

37. Radio towers are used for transmitting a range of communication services including radio and television. The tower will either act as an antenna itself or support one or more antennas on its structure. On a similar concept, a radio station tower was built in two Sections A and B . Tower is supported by wires from a point O .

Distance between the base of the tower and point O is 36 cm. From point O , the angle of elevation of the top of the Section B is 30° and the angle of elevation of the top of Section A is 45° .



Based on the above information, answer the following question:

(i) Find the length of the wire from the point O to the top of Section B . 1

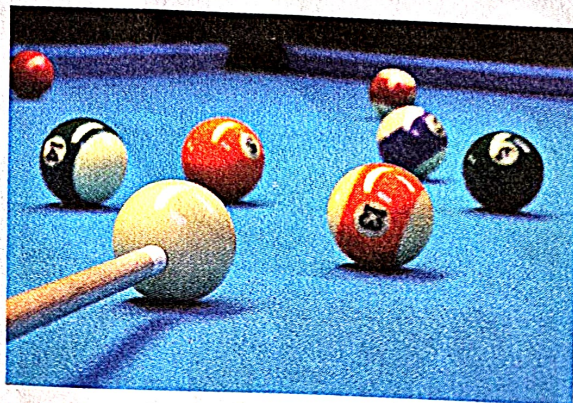
(ii) Find the distance AB . 2

OR

Find the area of $\triangle OPB$. 2

(iii) Find the height of the Section A from the base of the tower. 1

38. "Eight Ball" is a game played on a pool table with 15 balls numbered 1 to 15 and a "cue ball" that is solid and white. Of the 15 numbered balls, eight are solid (non-white) coloured and numbered 1 to 8 and seven are striped balls numbered 9 to 15.



The 15 numbered pool balls (no cue ball) are placed in a large bowl.

Case Study-based Questions

Each of the following questions are of 4 marks.

1. Read the following and answer any four questions from (i) to (v).

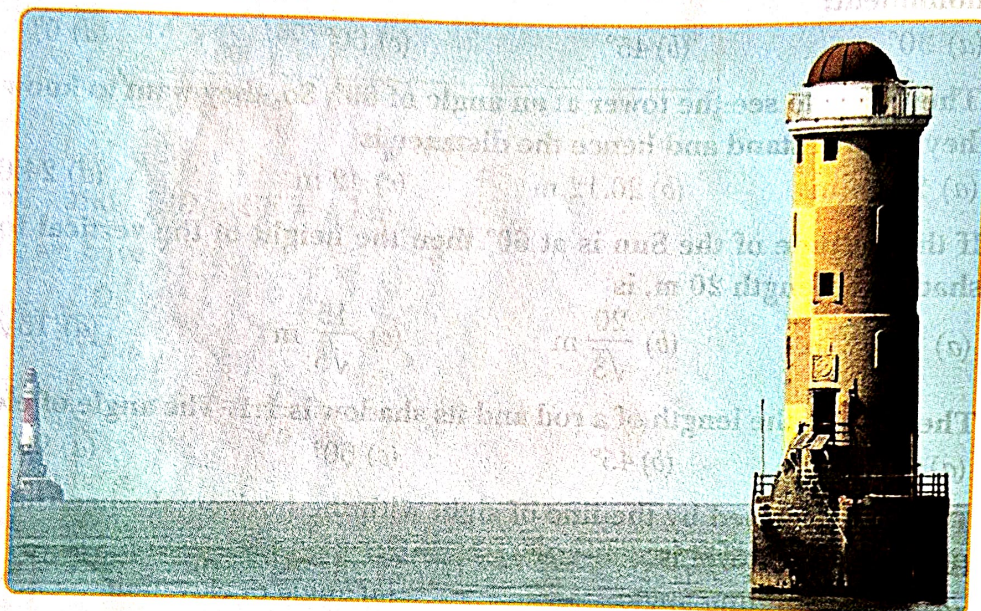
A group of students of class X visited India Gate on an education trip. The teacher and students had interest in history as well. The teacher narrated that India Gate, official name Delhi Memorial, originally called All-India War Memorial, monumental sandstone arch in New Delhi, dedicated to the troops of British India who died in wars fought between 1914 and 1919. The teacher also said that India Gate, which is located at the eastern end of the Rajpath (formerly called the Kingsway), is about 138 feet (42 metres) in height. [CBSE Question Bank]



- (i) What is the angle of elevation if they are standing at a distance of 42 m away from the monument?
- (a) 30° (b) 45° (c) 60° (d) 0°
- (ii) They want to see the tower at an angle of 60° . So, they want to know the distance where they should stand and hence the distance is
- (a) 24.24 m (b) 20.12 m (c) 42 m (d) 24.64 m
- (iii) If the altitude of the Sun is at 60° then the height of the vertical tower that will cast a shadow of length 20 m, is
- (a) $20\sqrt{3}$ m (b) $\frac{20}{\sqrt{3}}$ m (c) $\frac{15}{\sqrt{3}}$ m (d) $15\sqrt{3}$ m
- (iv) The ratio of the length of a rod and its shadow is 1:1. The angle of elevation of the Sun is
- (a) 30° (b) 45° (c) 60° (d) 90°
- (v) The angle formed by the line of sight with the horizontal when the object view is below the horizontal level is
- (a) corresponding angle (b) angle of elevation



2. A guard, stationed at the top of a 300 m tower, observed an unidentified boat coming towards it. A clinometer or inclinometer is an instrument used for measuring angles or slopes (tilt). The guard used the clinometer to measure the angle of depression of the boat coming towards the lighthouse and found it to be 30° .



Based on the above information answer the following questions.

- (i) Make a labelled figure on the basis of the given information and calculate the distance of the boat from the foot of the observation tower.
- (ii) After 10 minutes, the guard observed that the boat was approaching the tower and its distance from tower is reduced by $300(\sqrt{3} - 1)$ m. He immediately raised the alarm. What was the new angle of depression of the boat from the top of the observation tower?

Sol. (i)

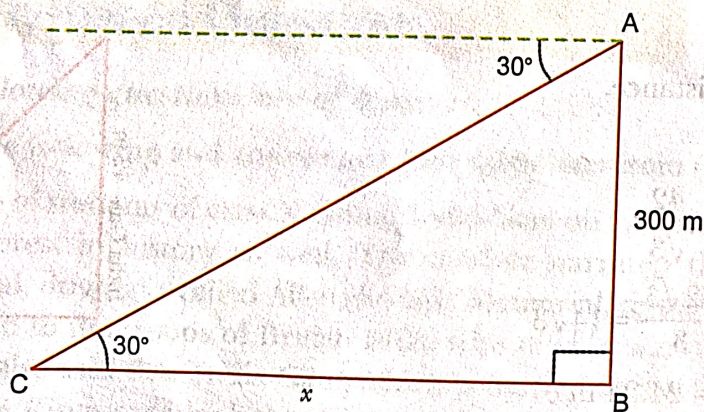


Fig. 10.45