Assignment 1 ICSE 2017

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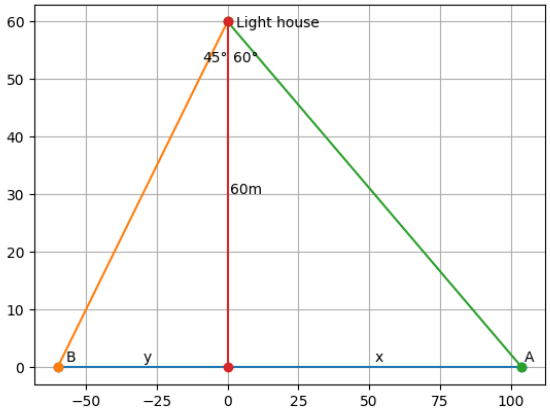
Q11 (a)

The angles of depression of two ships A and B as observed from the top of a light house 60 m high are 60° and 45° respectively. If the two ships are on the opposite sides of the light house, find the distance between the two ships. Give your answer correct to the nearest whole number.

Solution



Parameter	Symbol	Value
Height of tower	h	60m
Angle of dep. for ship A	θ_1	60°
Angle of dep. for ship B	θ_2	45°
Dist. of ship A from tower	x	?
Dist. of ship B from tower	y	?
Dist. of ship A from ship B	answer	?

The distance of ship A from light house (x) is given by $h \times \tan(\theta_1)$
The distance of ship B from light house (y) is given by $h \times \tan(\theta_2)$
Since the two ships are on opposite sides of the light house the distance between them can be obtained by adding their distances to the light house

$\therefore$ Distance between ships A and B (answer) $=$

$$\begin{aligned} x + y &= h \times \theta_1 + h \times \theta_2 \\ &= 60 \times \sqrt{3} + 60 \times 1 \\ &= 103.92 + 60 = 163.92 \end{aligned}$$

$\implies$ answer $= 164$