Question

Two hunters A and B of the same height of 1.6 tall were standing on a horizontal plane at the opposite direction.

The hunters sighted a bird on top of a coconut tree of height 8m standing between them.
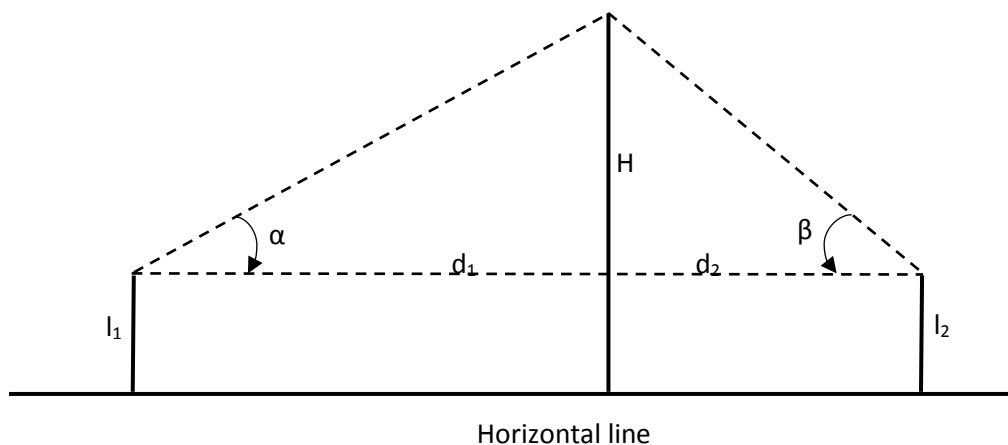
The angle of elevation of the two hunters A and B are 30 degree and 60 degree respectively.

1 (a) Sketch a diagram to illustrate this information.

1 (b) Which of the two hunters is closer to the coconut tree?

Solution

1 (a)

Horizontal line

l_1 - height hunter A

l_2 - height hunter B

d_1 – distance between hunter A and coconut tree

d_2 – distance between hunter B and coconut tree

H – height of coconut tree

α - angle of elevation hunter A

β – angle of elevation hunter B

l_1 = 1.6 m

l_2 = 1.6 m

H = 8 m
α = 30^0

β = 60^0

Solution

1(b)

$$\tan(\alpha) = \frac{(H - l_1)}{d_1}$$

$$d_1 = \frac{(H - l_1)}{\tan(\alpha)}$$

$$d_1 = \frac{(8 - 1.6)}{0.57735} = 11.085$$

$$\tan(\beta) = \frac{(H - l_2)}{d_2}$$

$$d_2 = \frac{(H - l_2)}{\tan(\beta)}$$

$$d_2 = \frac{(8 - 1.6)}{1.73205} = 3.695$$

Because $d_2 < d_1$, the hunter B is closer to the coconut tree.

Answer: the hunter B is closer to the coconut tree.