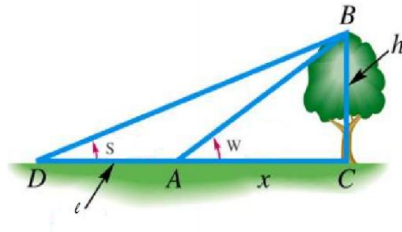**Condition:**

The angle of elevation of the top of a tree is found to be 33° at one point and 59° at a top a point 31 ft. nearer the tree. How high is the tree if both observation points and the base of the tree are in the same horizontal plane?

Solution:

$$S = 33°, W = 59°, l = 31 \text{ ft}$$

Triangle DCB $\rightarrow \tan S = \frac{h}{l+x} \rightarrow h = (l + x) \tan S.$

Triangle ACB $\rightarrow \tan W = \frac{h}{x} \rightarrow h = x \tan W.$

$$x \tan W = (l + x) \tan S.$$

$$x \tan W = l \tan S + x \tan S.$$

$$x \tan W - x \tan S = l \tan S.$$

$$x(\tan W - \tan S) = l \tan S.$$

$$x = \frac{l \tan S}{\tan W - \tan S}.$$

$$h = x \tan W = \frac{l \tan S \tan W}{\tan W - \tan S} = \frac{31 \tan 33 \tan 59}{\tan 59 - \tan 33} = 33.01 \, ft \cong 33 \, ft$$

Answer: 33 ft.