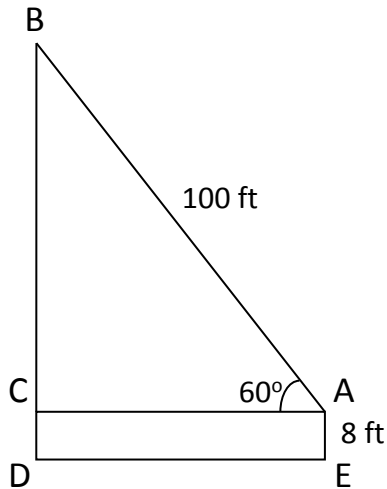# Answer on Question #45197 – Math – Geometry

## Question

Your town purchases a new fire truck with a 100 ft extension ladder. About how close can the fire truck come to a building when the ladder is fully extended at an angle of 60 degrees? The ladder extends from the top of the truck, 8 ft up. About how high up the building does the ladder reach?

## Solution

The task condition can be schematically represented as follows:



AB is the ladder. AB = 100 ft
Angle $\angle BAC = 60°$
AE is height of the truck. AE = CD = 8 ft
AC is the distance from the truck to the building.
BD is the height reached by the ladder.
BD = BC + CD

AC = ?

BD = ?

AC = AB · cos $\angle$ BAC = 100 · cos 60° = 100 · 0.5 = 50 ft

BC = AB · sin $\angle$ BAC = 100 · sin 60° = 100 · 0.866 = 86.6 ft

BD = BC + CD = 86.6 + 8 = 94.6 ft

**Answer:** the fire truck can come about **50 ft** to the building, when the ladder is fully extended at an angle of 60°. The ladder reaches about **94.6 ft** high up the building.