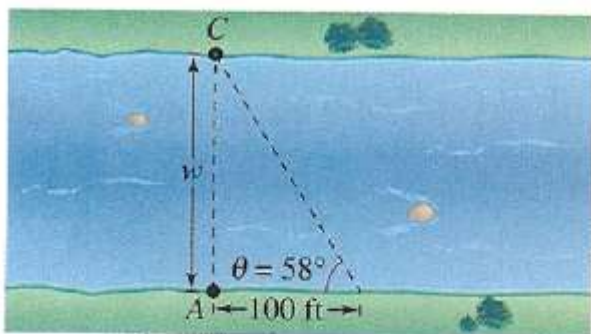


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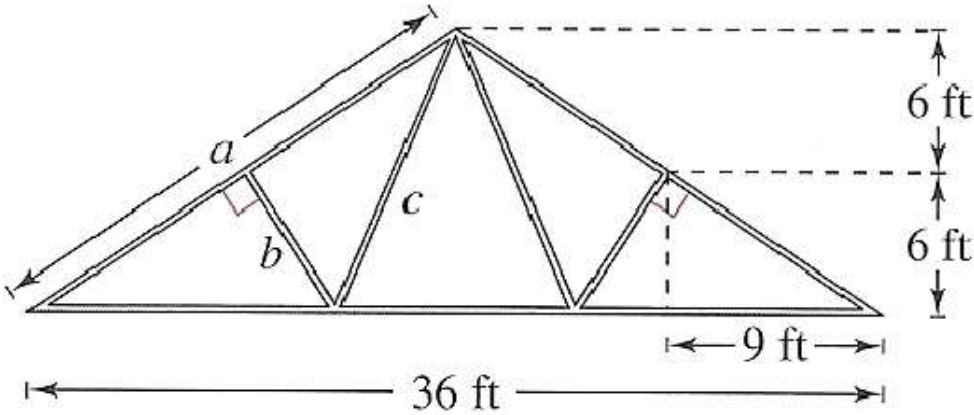
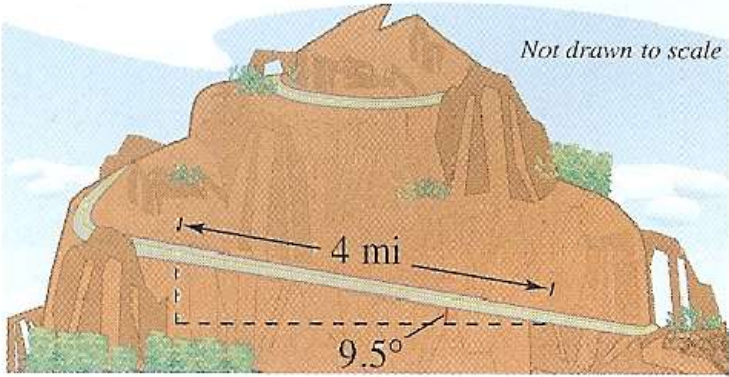
**Width** A biologist wants to know the width  $w$  of a river in order to properly set instruments for studying the pollutants in the water. From point  $A$ , the biologist walks downstream 100 feet and sights to point  $C$ . From this sighting, it is determined that  $\theta = 58^\circ$ . How wide is the river? Verify your result numerically.



**Exploration** Use a graphing utility to complete the table and make a conjecture about the relationship between  $\cos \theta$  and  $\sin(90^\circ - \theta)$ . What are the angles  $\theta$  and  $90^\circ - \theta$  called?

$\theta$	$0^\circ$	$20^\circ$	$40^\circ$	$60^\circ$	$80^\circ$
$\cos \theta$					
$\sin(90^\circ - \theta)$					

**Mountain Descent** A sign on the roadway at the top of a mountain indicates that for the next 4 miles the grade is  $9.5^\circ$  (see figure). Find the change in elevation for a car descending the mountain.



- 34. Location of a Fire** Two fire towers are 30 kilometers apart, where tower  $A$  is due west of tower  $B$ . A fire is spotted from the towers, and the bearings from  $A$  and  $B$  are  $E\ 14^\circ\ N$  and  $W\ 34^\circ\ N$ , respectively. Find the distance  $d$  of the fire from the line segment  $AB$ .

