

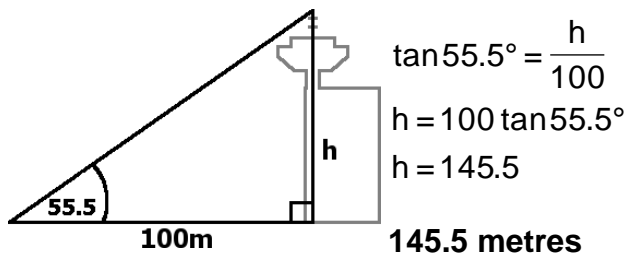
**Word Problems:****Right-Angled Triangles**

1. If Adrian measures the angle of elevation to the top of the Harbour Centre to be 55.5° when he is 100 m away, how tall is the Harbour Centre?
2. If Maribel has a 3.0-m ladder and wants to use it to reach the top of a 2.25-m wall, how far away from the wall should the base of the ladder be? (The top of the ladder will touch the top of the wall).
3. At 1:00 PM, the angle of elevation of the sun is 60° . Will the shadow of a 5.3-m tree be long enough for a 1.62-m tall person to stretch out in?
4. A boat leaves the dock at a bearing of $S15^\circ W$. After travelling for 2 hours at 40 km/h, how far west has it travelled?
5. A plane leaves the airport at a bearing of 232° . After travelling for 2 hours, it is 788 km west of the airport. How far has the airplane travelled?
6. A UFO is sighted directly east of Reina's house. Anil lives 10 km due north of Reina, and estimates his angle to the UFO to be $S50^\circ E$. How far away is Reina from the UFO?
7. A picture in an art gallery is hung tipped forward, so that the bottom of the picture and the wall form a 10° angle to provide the best view. If a 45-cm tall picture is hung in this way, how far from the wall will the top of the picture be?
8. Looking out of an office window downtown, you notice that when you face One Wall Centre, you have to look up 18.4° to see its top and you must look down 33.7° to see its base. If you know that you are 150 m away, how tall is One Wall Centre?
9. A boat leaves the dock at A and travels at $N60^\circ W$ to an island due north of the beach at B, which is 0.72 km west of A. The boat continues from the island to another dock at C, 1.83 km west of A. At what bearing will the boat approach dock C?
10. In order to measure the height of Grouse Mountain, Emma measures the angle of elevation to the summit to be 30° . She then moves 2 km farther away and measures the angle of elevation to be 16.6° . How tall is Grouse Mountain?

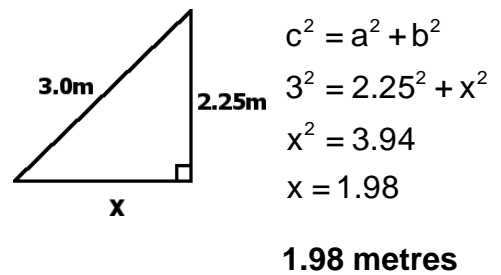


Solutions

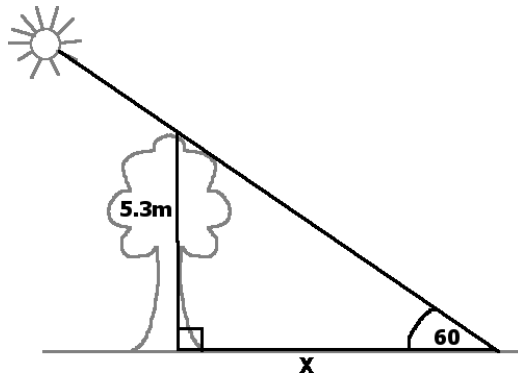
1.



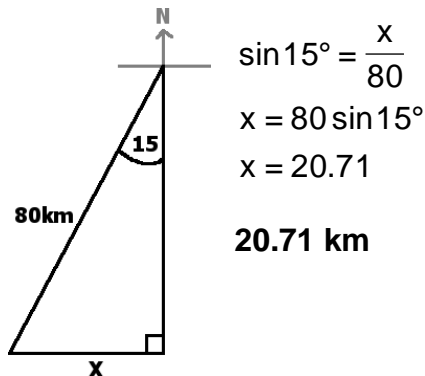
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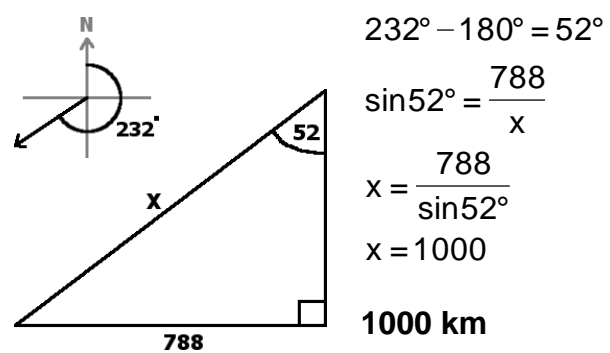
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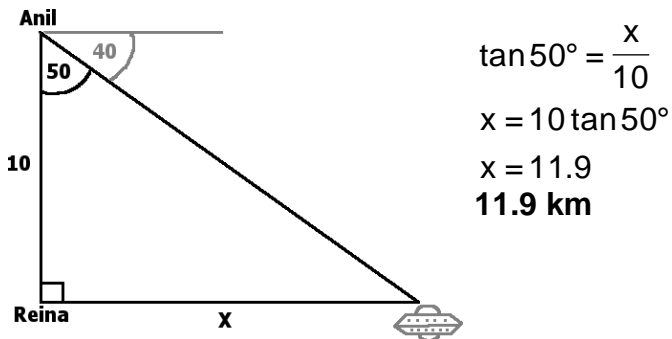
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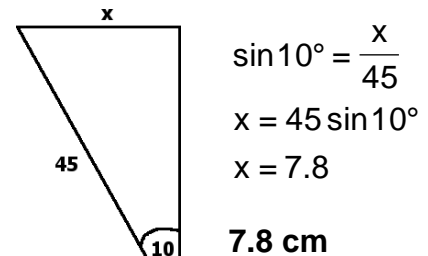
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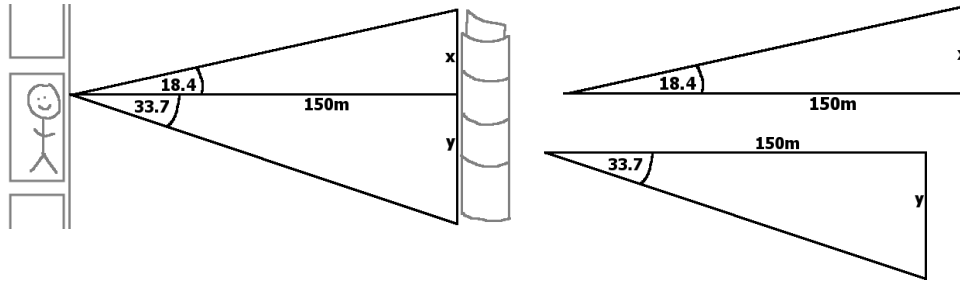
6.



7.



8.



$$\tan 18.4^\circ = \frac{x}{150}$$

$$x = 150 \tan 18.4^\circ$$

$$x = 49.9$$

$$\tan 33.7^\circ = \frac{y}{150}$$

$$y = 150 \tan 33.7^\circ$$

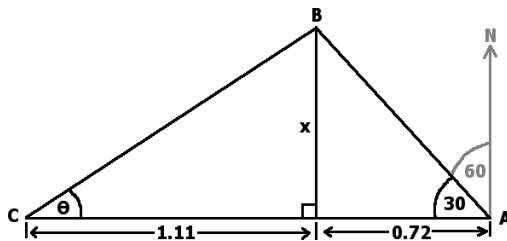
$$y = 100$$

$$x + y = h$$

$$49.9 + 100 = 149.9$$

150m

9.



$$\tan 30^\circ = \frac{x}{0.72}$$

$$x = 0.72 \tan 30^\circ$$

$$x = 0.416$$

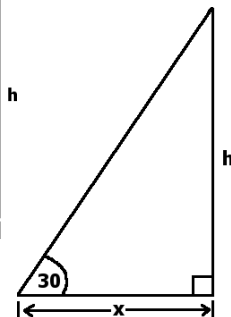
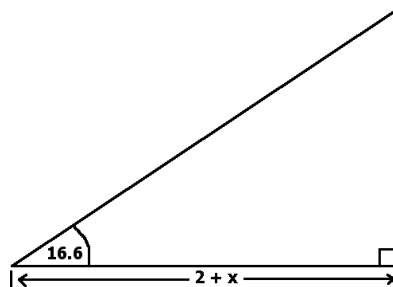
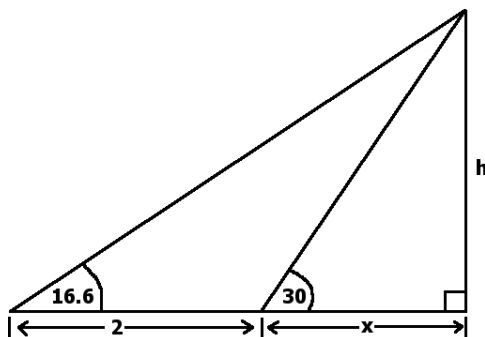
$$\tan \theta = \frac{1.11}{0.416}$$

$$\theta = \tan^{-1}(2.668)$$

$$\theta = 69.5$$

S69.5°W

10.



$$\tan 16.6^\circ = \frac{h}{x+2}$$

$$x = \frac{h}{\tan 16.6^\circ} - 2$$

$$\tan 30^\circ = \frac{h}{x}$$

$$x = \frac{h}{\tan 30^\circ}$$

$$\frac{h}{\tan 30^\circ} = \frac{h}{\tan 16.6^\circ} - 2$$

$$2 = \frac{h}{\tan 16.6^\circ} - \frac{h}{\tan 30^\circ}$$

$$2 = h \left(\frac{1}{\tan 16.6^\circ} - \frac{1}{\tan 30^\circ} \right)$$

$$h = 1.233$$

1.233km or 1233m

