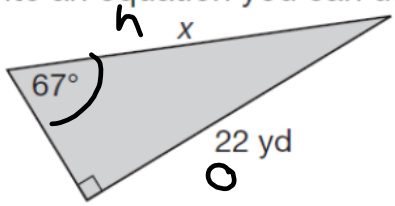
8.7

Solving Right Triangle Problems

Try These

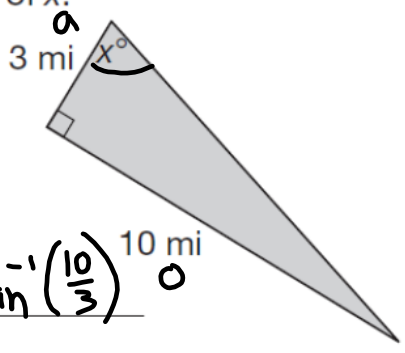
Write an equation you can use to find the value of x.

i)



$x =$ $\frac{22}{\sin 67^\circ}$

ii)

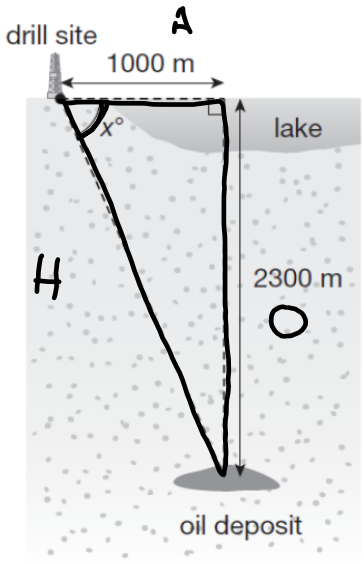


$x^\circ =$ $\tan^{-1}\left(\frac{10}{3}\right)$

$\sin 67^\circ = \frac{22}{x}$

$\tan x = \frac{10}{3}$

Jamie works for an oil company. He needs to drill a well to an oil deposit below the surface of a lake. The drill site is located on land as shown. What is the angle of depression for drilling the well? (Round to the nearest tenth.)



1. What equation can you use to calculate $x°$?

$\tan x° = \frac{2300}{1000}$, so

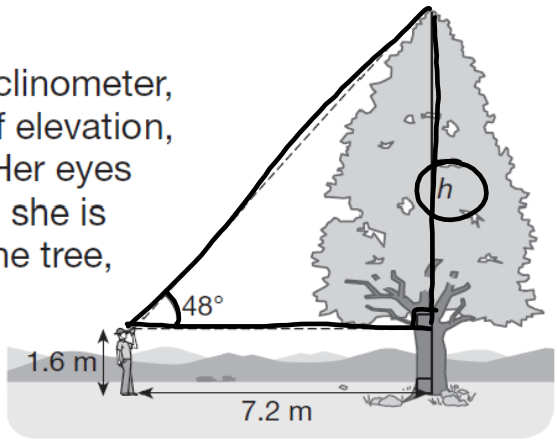
$x° = \tan^{-1}\left(\frac{2300}{1000}\right)$

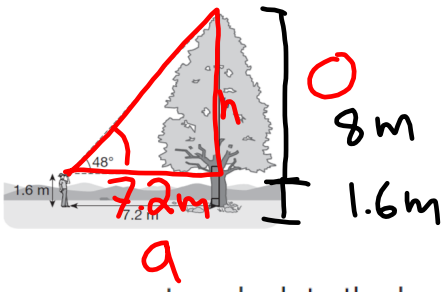
2. Calculate the angle to the nearest tenth. $x° = 66.5014...$

The well should be drilled at an angle of $66.5°$.

Example

Glenda is a forester. She uses a clinometer, a device that measures angles of elevation, to sight the top of a tree at 48°. Her eyes are 1.6 m above the ground, and she is 7.2 m from the tree. How tall is the tree, to one decimal place?





Solution

A. What equation can you use to calculate the length of the side opposite the 48° angle?

$$\tan 48^\circ = \frac{h}{7.2}$$

B. Solve it. $\tan 48^\circ \times 7.2 = h$

$7.996\ldots = h$

The height of the opposite side is 8 m, to the nearest tenth.

C. How tall is the tree? 8 m + 1.6 m = 9.6 m