

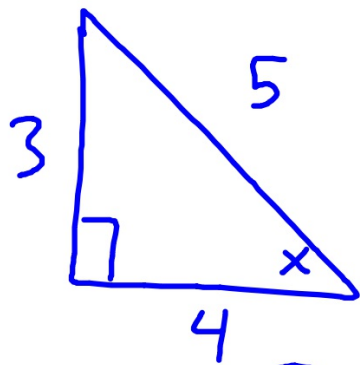
9.4 The Tangent Ratio

Learning Target

Understand and use the tangent ratio.

Success Criteria

- I can explain the tangent ratio.
- I can find tangent ratios.
- I can use tangent ratios to solve real-life problems.



$$\sin x = \frac{3}{5} = .6$$

$$\cos x = \frac{4}{5} = .8$$

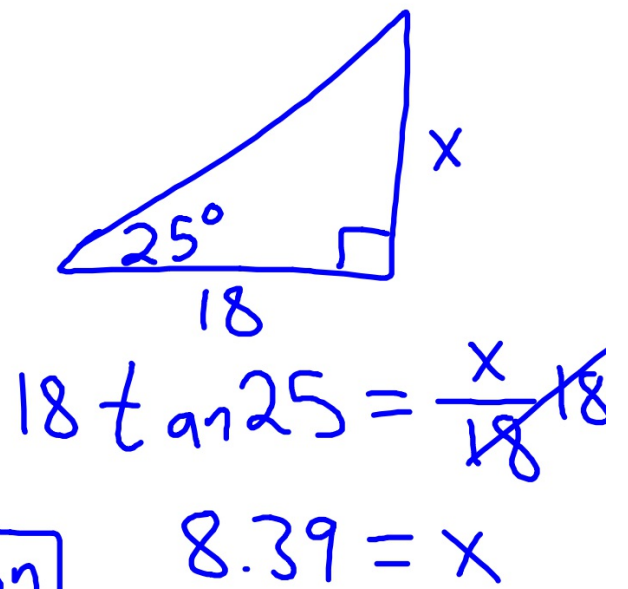
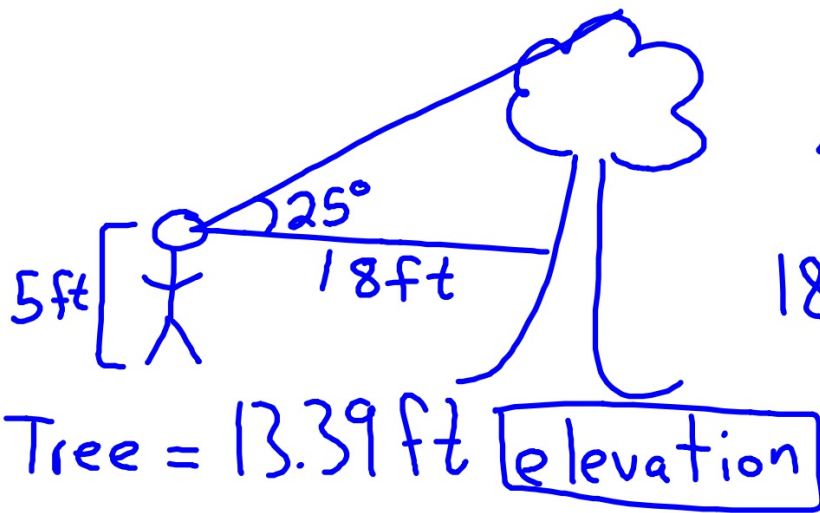
$$\tan x = \frac{3}{4} = .75$$

Vocab:

~~Trigonometric Ratio~~

~~Tangent~~

Angle of Elevation → Angle from eye level
to the top of the object

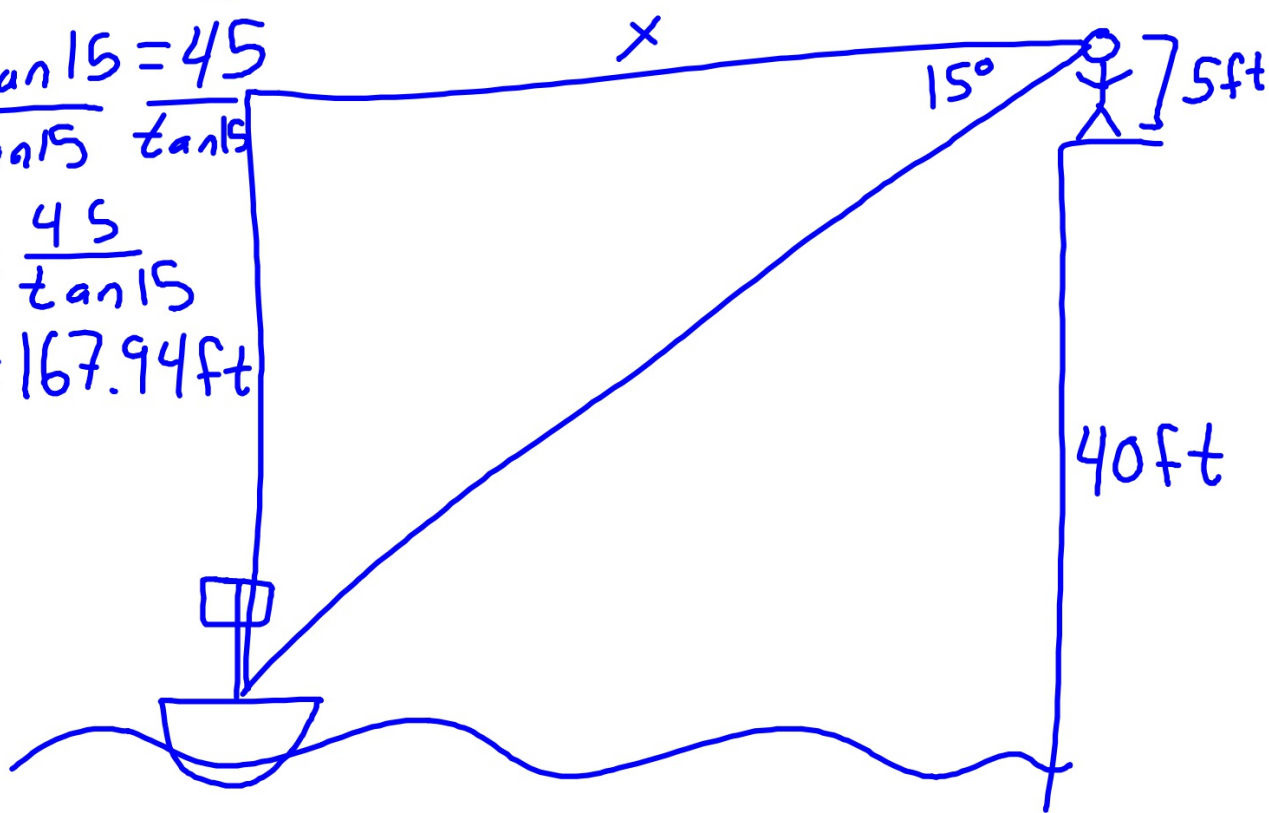


Angle of Depression - Angle from eye level down to the object

$$\therefore \tan 15 = \frac{45}{x}$$

$$\frac{x \tan 15}{\tan 15} = \frac{45}{\tan 15}$$

$$x = \frac{45}{\tan 15} \\ = 167.94 \text{ ft}$$



EXAMPLE 1**Finding Tangent Ratios**

$$x + 8 = 10$$
$$x \div$$

Find $\tan S$ and $\tan R$. Write each answer as a fraction and as a decimal.

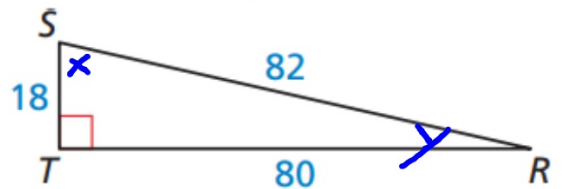
Find $\angle S$ + $\angle R$

$$\tan x = \frac{80}{18}$$

$$x = \tan^{-1}\left(\frac{80}{18}\right) = 77.32$$

$$\tan y = \frac{18}{80}$$

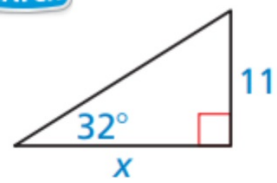
$$y = \tan^{-1}\left(\frac{18}{80}\right) = 12.68$$



EXAMPLE 2**Finding a Leg Length**

Find the value of x .

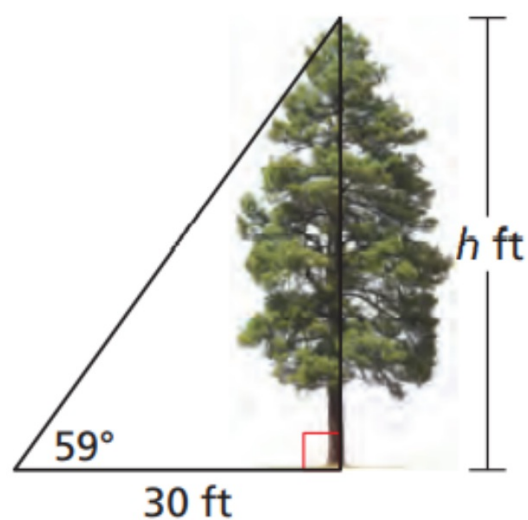
SOLUTION



EXAMPLE 4 Modeling Real Life

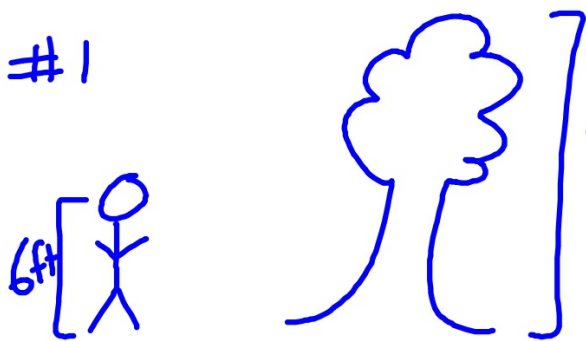


You measure your distance from a tree and the angle of elevation from the ground to the top of the tree. Find the height of the tree.

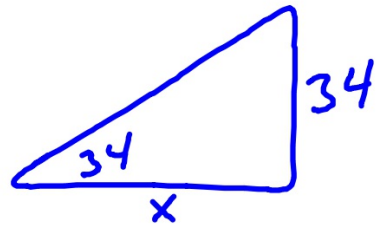


SOLUTION

#1



$$x = \frac{34}{\tan 34}$$



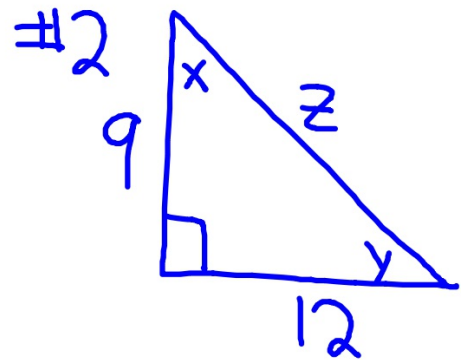
how far from the tree if elevation is
 34° 50.41 ft

$$\tan x = \frac{12}{9}$$

$$x = \tan^{-1}\left(\frac{12}{9}\right) = 53.13$$

$$y = \tan^{-1}\left(\frac{9}{12}\right) = 36.87$$

$$\sin 36.87 = \frac{9}{z} \quad z = \frac{9}{\sin 36.87} = 15$$



$$x \frac{\tan 41}{\tan 41} = \frac{12}{x} \frac{x}{\tan 41}$$

$$x = \frac{12}{\tan 41}$$

HW:

p 473

1-31 odd