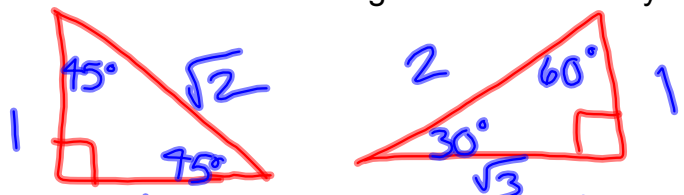
Review:

Draw the 30-60-90 and 45-45-90 triangles with accurately labeled sides and angles.



The function of an angle is equal to the cofunction of its complement.

The function of an angle is equal to the cofunction of its complement.

Reciprocal Identities:

$\csc x = \frac{1}{\sin x}$

$\cos x = \frac{1}{\sec x}$

$\cot x = \frac{1}{\tan x}$

Ratio Identities:

$\frac{\cos x}{\sin x} = \cot x$

$\frac{\sin x}{\cos x} = \tan x$

Homework questions?

Cofunction Identities:

$$\sin(90° - \theta) = \cos\theta \quad , \quad \cos(90° - \theta) = \sin\theta$$
$$\tan(90° - \theta) = \cot\theta \quad , \quad \cot(90° - \theta) = \tan\theta$$
$$\csc(90° - \theta) = \sec\theta \quad , \quad \sec(90° - \theta) = \csc\theta$$

Example Problem 5.5 #98

Given that

$\sin 8° \approx 0.1392$ $\quad$ $\csc 8° \approx 7.1853$
$\cos 8° \approx 0.9903$ $\quad$ $\sec 8° \approx 1.0098$
$\tan 8° \approx 0.1405$ $\quad$ $\cot 8° \approx 7.1154$

find the six function vales of $82°$.

$\sin 82° = \cos(90° - 82°) = \cos 8° \approx 0.9903$

$\csc 82° = \sec 8° \approx 1.0098$

Degrees, Minutes and Seconds

$$\begin{array}{r} {}^{2}.14 \\ \times\ 60 \\ \hline 8.40 \end{array}$$

(5.1) $D^\circ M' S''$

$1^\circ = 60'$ $\quad 1' = \frac{1}{60}^\circ$

$1' = 60''$ $\quad 1'' = \frac{1}{60}' = \frac{1}{3600}^\circ$

Convert 20.14° to degrees, minutes, seconds.

$20^\circ + .14^\circ \cdot \frac{60'}{1^\circ} = 20^\circ + 8.4' = 20^\circ + 8' + .4'$

$= 20^\circ + 8' + .4' \cdot \frac{60''}{1'} = 20^\circ 8' 24''$

Convert $12^\circ 6' 12''$ to decimal degrees.

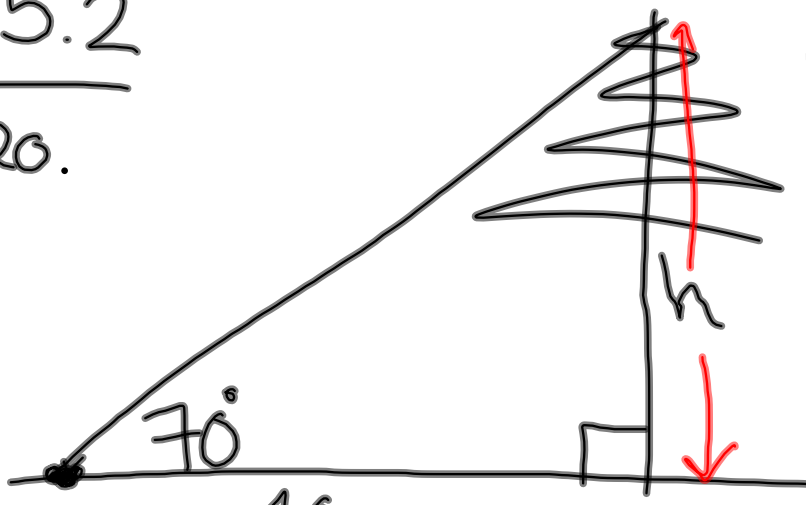
$12^\circ + \frac{6}{60}^\circ + \frac{12}{3600}^\circ = 12^\circ + 0.1^\circ + \frac{1}{300}^\circ$

$\frac{1}{3} = 0.\overline{3} \cdot \frac{1}{100} = 0.00\overline{3} \qquad = 12.10\overline{3}^\circ$

Applications of Right Triangles

$\frac{5.2}{20.}$

* angles of elevation and depression are always measured from the horizontal

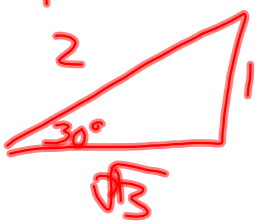


$\tan 70° = \frac{h}{40\text{ cm}}$; $h = \boxed{40 \tan 70° \text{ cm}}$

≈ 110 cm

(#26)

$100 + \frac{100}{\sqrt{3}}$ ft



$\tan 45° = \frac{y}{100}$

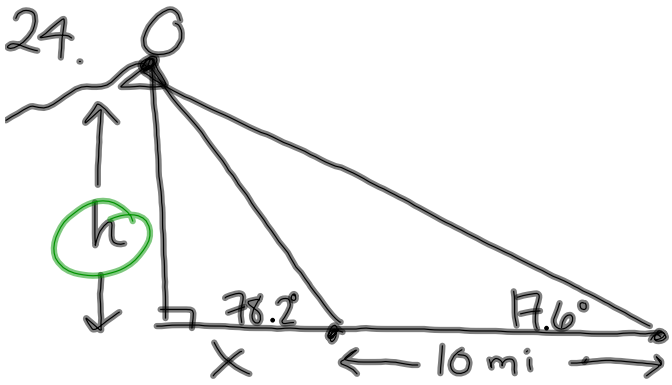
$y = 100 \tan 45°$

$\tan 30° = \frac{x}{100}$

$x = 100 \tan 30°$

$h = 100 \cdot 1 + 100 \cdot \frac{1}{\sqrt{3}} = \boxed{100 + \frac{100}{\sqrt{3}} \text{ ft}}$

24.



$\tan 17.6° = \frac{h}{x+10}$; $\tan 78.2° = \frac{h}{x}$

$x \tan 78.2° = h$

$x = \frac{h}{\tan 78.2°}$

$\tan 17.6° = \frac{h}{\frac{h}{\tan 78.2°} + 10}$

$\tan 17.6° \left(\frac{h}{\tan 78.2°} + 10\right) = h$

$h \cdot \frac{\tan 17.6°}{\tan 78.2°} + 10 \tan 17.6° = h$

$5x + 6 = x$ $\quad 2h - hx$

$10 \tan 17.6° = 1h - h \frac{\tan 17.6°}{\tan 78.2°}$ $\quad h(2-x)$

$10 \tan 17.6° = h\left(1 - 1\frac{\tan 17.6°}{\tan 78.2°}\right)$

$\frac{10 \tan 17.6°}{\left(1 - \frac{\tan 17.6°}{\tan 78.2°}\right) mi} = h$

≈ 3.4 mi

5.1 #47 | 5.2 #19, 21, 29