

TRIG REVIEW

Soh-Cah-Toa

Find the value of the trig function indicated. (hint: answer should be a ratio)

1) $\cos \theta$

$3^2 + 4^2 = 5^2$

$\cos \theta = \frac{\text{adj}}{\text{hyp}} = \frac{3}{5}$

2) $\sin \theta$

$5^2 + 12^2 = c^2$
 $25 + 144 = c^2$
 $\sqrt{169} = \sqrt{c^2}$
 $13 = c$

$\sin \theta = \frac{12}{13}$

3) $\tan \theta$

$a^2 + 15^2 = 17^2$
 $a^2 + 225 = 289$
 $\sqrt{a^2} = \sqrt{64}$
 $a = 8$

$\tan \theta = \frac{8}{15}$

4) $\tan \theta$

$a^2 + (9\sqrt{5})^2 = 21^2$
 $a^2 + (81 \cdot 5) = 441$
 $a^2 + 405 = 441$
 $\sqrt{a^2} = \sqrt{36}$
 $a = 6$

$\tan \theta = \frac{6}{9\sqrt{5}} = \frac{6\sqrt{5}}{9 \cdot 5} = \frac{6\sqrt{5}}{45} = \frac{2\sqrt{5}}{15}$

Find the measure of angle θ . Round to the nearest tenth.

5) Think: find ratio or length, use trig; find θ use trig^{-1}

$\sin \theta = \frac{\text{opp}}{\text{hyp}}$
 so... $\sin^{-1}\left(\frac{\text{opp}}{\text{hyp}}\right) = \theta$
 $\sin^{-1}\left(\frac{2}{4.5}\right) = \theta$

$26.4^\circ = \theta$

6)

$\tan^{-1}\left(\frac{7.6}{5}\right) = \theta$
 $56.7^\circ = \theta$

Find the measure of each side indicated. Round to the nearest tenth.

7)

$\tan 29^\circ = \frac{8}{x}$
 $x = \frac{8}{\tan 29^\circ}$
 $x = 14.4$

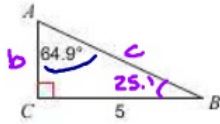
8)

$\tan 42.1^\circ = \frac{12}{x}$
 $x = \frac{12}{\tan 42.1^\circ}$
 $x = 13.3$

Solve: every angle and every side

Solve each triangle. Round answers to the nearest tenth.

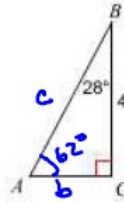
9)



$$\begin{aligned} \tan 25.1^\circ &= \frac{b}{5} \\ 5 \cdot \tan 25.1^\circ &= b \\ 2.3 &= b \end{aligned}$$

$$\begin{aligned} \angle A &= 64.9^\circ & a &= 5 & \sin 64.9^\circ &= \frac{5}{c} \\ \angle B &= 25.1^\circ & b &= 2.3 & c &= \frac{5}{\sin 64.9^\circ} \\ \angle C &= 90^\circ & c &= 5.5 & c &= 5.5 \end{aligned}$$

10)

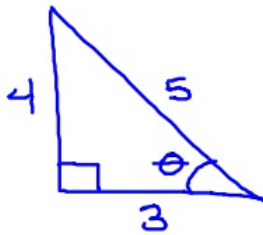


$$\begin{aligned} \tan 28^\circ &= \frac{b}{4} \\ 4 \cdot \tan 28^\circ &= b \\ 2.1 &= b \end{aligned}$$

$$\begin{aligned} \angle A &= 62^\circ & a &= 4 & \cos 28^\circ &= \frac{4}{c} \\ \angle B &= 28^\circ & b &= 2.1 & c &= \frac{4}{\cos 28^\circ} \\ \angle C &= 90^\circ & c &= 4.5 & c &= 4.5 \end{aligned}$$

Find the value of the trig function indicated.

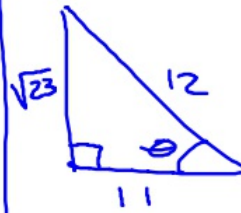
11) Find $\cos \theta$ if $\sin \theta = \frac{4}{5} = \frac{\text{opp}}{\text{hyp}}$



$$3^2 + 4^2 = 5^2$$

$$\boxed{\cos \theta = \frac{3}{5}}$$

12) Find $\tan \theta$ if $\cos \theta = \frac{11}{12} = \frac{\text{adj}}{\text{hyp}}$

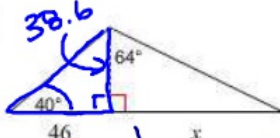


$$\begin{aligned} 11^2 + b^2 &= 12^2 \\ 121 + b^2 &= 144 \\ \sqrt{b^2} &= \sqrt{23} \\ b &= \sqrt{23} \end{aligned}$$

$$\boxed{\tan \theta = \frac{\sqrt{23}}{11}}$$

Find the length of the side labeled x . Keep intermediate answers exact! Round your final answer to the nearest tenth.

13)



$$\begin{aligned} \tan 40^\circ &= \frac{46}{46} \\ 46 \cdot \tan 40^\circ &= h \\ 38.6 &= h \end{aligned}$$

$$\begin{aligned} \tan 64^\circ &= \frac{x}{38.6} \\ 38.6 (\tan 64^\circ) &= x \\ \boxed{79.1} &= x \end{aligned}$$

14) What range of values can $\tan \theta$ be?

$$0 \leq \theta < 90^\circ$$

$$\tan 90^\circ = \text{undefined}$$

Simplify the given expressions. SHOW YOUR WORK!!!

15) $\frac{(1) - \cos^2 x}{\sin^2 x}$

$$\frac{(\cos^2 \theta + \sin^2 \theta) - \cos^2 \theta}{\sin^2 \theta}$$

$$\frac{\sin^2 \theta}{\sin^2 \theta} = 1$$

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

$$\cos^2 \theta + \sin^2 \theta = 1$$

16) $\cos^2 \theta + \frac{1 - \cos^2 \theta}{\sin^2 \theta} + \sin^2 \theta$

$$\cos^2 \theta + \frac{\sin^2 \theta}{\sin^2 \theta} + \sin^2 \theta$$

$$\cos^2 \theta + 1 + \sin^2 \theta$$

$$\cos^2 \theta + \sin^2 \theta + 1$$

$$1 + 1 = 2$$

17) $\cos^2 x + \sin x \cdot \tan x \cdot \cos x$

$$\cos^2 x + \frac{\sin x}{1} \left(\frac{\sin x}{\cos x} \right) \frac{\cos x}{1}$$

$$\cos^2 x + \sin^2 x$$

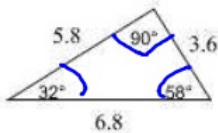
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18) Challenge: Simplify the given expression.
Show your work!!!

$$\frac{\sin^4 x - \cos^4 x}{\sin^2 x - \cos^2 x}$$

Challenge: Classify the triangle by its angles and sides.

19)

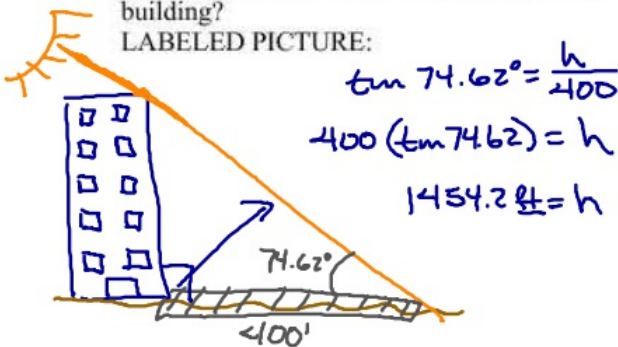


acute scalene

Draw a picture of the situation, labeling everything. Then answer to the nearest TENTH.

20) You want to figure out the height of the empire state building from the ground. The shadow that the building casts is 400 feet long and the angle from the ground to the top of the building is 74.62° . Rounding to the nearest TENTH of a foot, how tall is the building?

LABELED PICTURE:



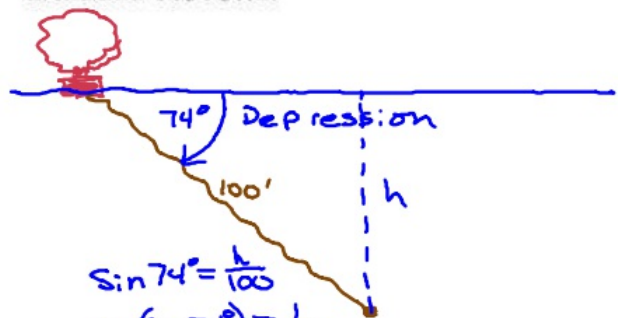
$$\tan 74.62^\circ = \frac{h}{400}$$

$$400 (\tan 74.62) = h$$

$$1454.2 \text{ ft} = h$$

21) A hot air balloon is tethered with a 100 meter rope. The angle of depression that the balloon makes with the tether point is 74° . What is the horizontal distance from the tether point to the balloon?

LABELED PICTURE:



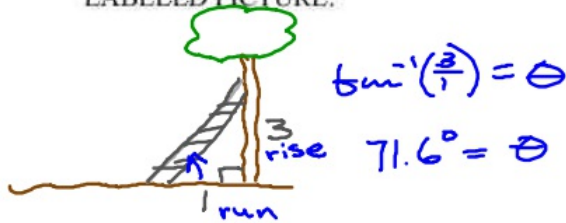
$$\sin 74^\circ = \frac{h}{100}$$

$$100 (\sin 74^\circ) = h$$

$$\underline{96.1 \text{ m}} = h$$

- 22) To properly follow code, a ladder has to have a rise that is 3 times the run. What angle of elevation does the ladder create when it follows code.

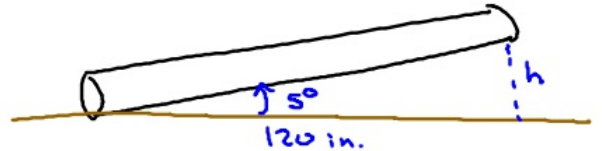
LABELED PICTURE:



- 23) If a pipe is sloping at an angle of elevation of 5° , how much does the elevation change in inches after travelling 10 feet horizontally?

LABELED PICTURE:

Carefull
 10 feet = 120 inches.



$$\tan 5^\circ = \frac{h}{120}$$

$$120 (\tan 5^\circ) = h$$

$$10.5 \text{ in} = h$$

- 24) Challenge: Two buildings are 50 feet apart. The first building is 80 feet tall and looking from the edge of the first building to the close edge of the second building creates an angle of depression of 14° . How tall is the second building?

LABELED PICTURE:

