11-1 Inverse Trigonometric Functions

Objectives:

I can use inverse trig functions to find missing sides and missing angles of right triangles.

Feb 23-9:10 AM

Once you know the sine, cosine or the tangent of an acute angle, then you can use a calculator to find the measure of the angle.

For acute angle A: mode 2nd sin

If $\sin A = x$, then $\sin^{-1}(x) = m\measuredangle A$

$\sin A = \frac{6}{13}$ $\sin^{-1}\left(\frac{6}{13}\right) = 27^\circ$

If $\cos A = x$, then $\cos^{-1}(x) = m\measuredangle A$

$\cos A = \frac{27}{80} \approx 70^\circ$

If $\tan A = x$, then $\tan^{-1}(x) = m\measuredangle A$

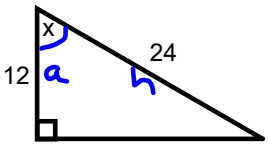
$\tan A = 23.5$ $A = 87.5^\circ$

Oct 20-4:58 PM

Inverse Trig

Find the measure of the indicated angle to the nearest **degree** (hint: calculator mode)

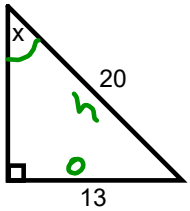
a)



$\cos\theta = \frac{a}{h}$

$\cos x = 12/24 = \frac{1}{2} = 60^\circ, \frac{\pi}{3}$

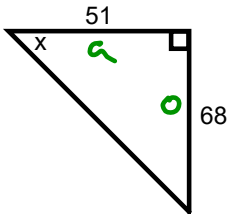
b)



$\sin\theta = \frac{o}{h}$

$\sin x = \frac{13}{20}$ $x = 40.54^\circ$

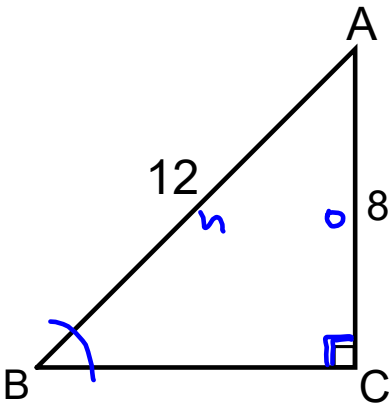
c)



$\tan x = \frac{68}{51}$ $x = 53.1^\circ$

Oct 27-3:24 PM

Find the angles of the right triangle. Round to the nearest **degree.**



$\measuredangle A = 48.2$

$\measuredangle B = 41.8$

$\measuredangle C = 90^\circ$

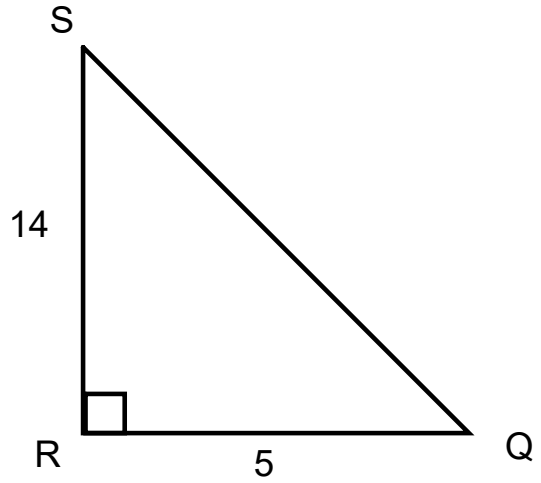
180°
-90
-41.8

$\sin B = \frac{8}{12}$

$\sin^{-1}\left(\frac{8}{12}\right)$

Feb 23-9:46 AM

Find the angles of the right triangle. Round to the nearest **degree.**



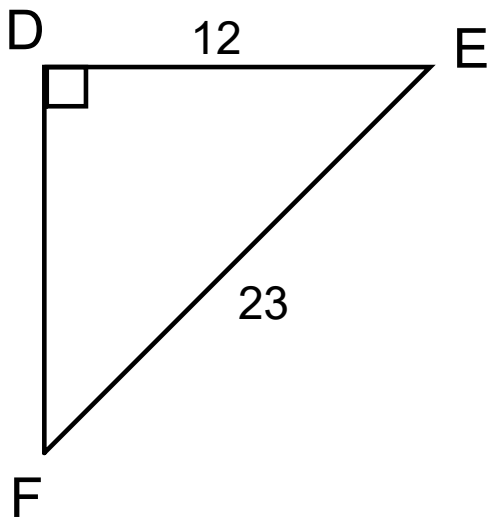
$\measuredangle Q =$

$\measuredangle R =$

$\measuredangle S =$

Feb 17-2:19 PM

Find the angles of the right triangle. Round to the nearest **degree.**



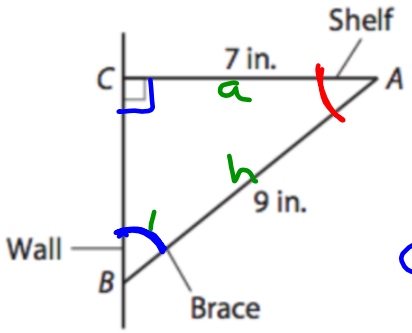
$\measuredangle D =$

$\measuredangle E =$

$\measuredangle F =$

Feb 17-2:19 PM

A shelf extends perpendicularly 7 in. from a wall. You want to place a 9-in. brace under the shelf, as shown. To the nearest degree, what angle will the brace make with the wall? What angle will the brace make with the shelf?



$\sin\theta = \frac{7}{9}$

$\sin^{-1}\left(\frac{7}{9}\right) = 51^\circ$

$\cos\theta = \frac{7}{9}$

$\cos^{-1}\left(\frac{7}{9}\right) = 39^\circ$

Feb 23-9:57 AM

Find the exact value. Find ***ALL*** possible solutions.

$$\sin\left(\tan^{-1}\frac{\sqrt{3}}{3}\right) = -\frac{1}{2}, \frac{1}{2} \qquad \cos\left(\sin^{-1}\frac{\sqrt{3}}{2}\right) \boxed{\frac{1}{2}, -\frac{1}{2}}$$

$\sin\left(\frac{7\pi}{6}\right)$ $-\frac{1}{2}$ $\sin\left(\frac{\pi}{6}\right)$ $\frac{1}{2}$ $\frac{\pi}{3}, \frac{2\pi}{3}$

$$\sin^{-1}\left(\cos\frac{\pi}{3}\right) = \frac{\pi}{6}, \frac{5\pi}{6} \qquad \cos^{-1}\left(\sin\frac{3\pi}{2}\right) \boxed{\pi}$$

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

Feb 25-3:21 PM

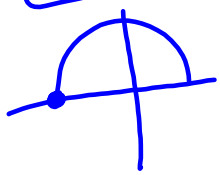
Find the exact value. Find ***ALL*** possible solutions.

$$\sin\left(\underbrace{\cos^{-1}\left(\frac{1}{2}\right)}_{\sin\frac{\pi}{3},\ \sin\frac{5\pi}{3}}\right) \quad \frac{\sqrt{3}}{2}, -\frac{\sqrt{3}}{2}$$

$$\tan\left(\underbrace{\sin^{-1}\left(\frac{\sqrt{2}}{2}\right)}_{\tan\frac{\pi}{4} \quad \tan\frac{3\pi}{4}}\right) \quad 1, -1$$

$$\cos^{-1}\left(\underbrace{\sin\left(\frac{\pi}{6}\right)}_{\cos^{-1}\frac{1}{2}}\right) \quad \frac{\pi}{3}, \frac{5\pi}{3}$$

$$\sin^{-1}\left(\underbrace{\cos\left(\frac{\pi}{2}\right)}_{\sin^{-1}0}\right) \quad \boxed{0, 2\pi, \pi}$$



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