

April 7 (Tu)

Using Trigonometric Ratios to find Angles

$$\frac{A}{\sin} = \sin^{-1} A$$

Example 1 Calculate the angle x to the nearest degree

Now, we want x alone. To do this, we usually perform the opposite operation on x .

For example when we have $2x = 6$,
2 is multiplying x , so we divide both sides by 2 to find x .

* -1 is not an exponent.
↳ means "inverse"

The opposite operation for $\sin A$ is $\sin^{-1} A$. (= sine inverse)

$$= \frac{1}{\sin x} = \sin^{-1} x$$

a) $\sin x = 0.707$

$$\frac{\sin x}{\sin} = \frac{0.707}{\sin}$$

$$x = \sin^{-1} 0.707$$

$$x = 45^\circ$$

d) $\sin x = 0.848$

b) $\cos x = 0.259$

e) $\frac{\cos x}{\cos} = \frac{0.985}{\cos}$

$$\Rightarrow x = \cos^{-1} 0.985$$

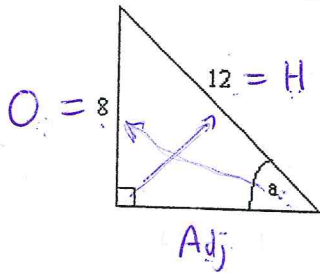
$$x = 10^\circ$$

c) $\tan x = 1.732$

f) $\frac{\tan x}{\tan} = \frac{-5.671}{\tan}$

$$\Rightarrow x = \frac{-5.671}{\tan} = \tan^{-1} -5.671$$

Example 6 Finding angle a .



SOH CAH TOA

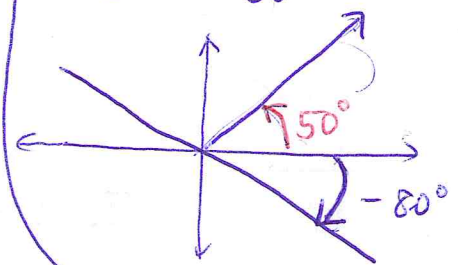
$$\text{SOH} \Rightarrow \sin a = \frac{O}{H}$$

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

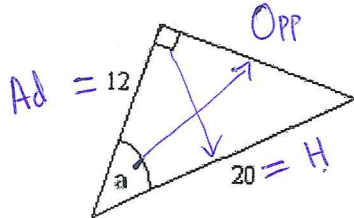
$$a = \sin^{-1} \frac{8}{12} = 41.8^\circ = 42^\circ$$

$$x = \tan^{-1} -5.671$$

$$x = -80^\circ$$



Example 7



$\angle a = ?$ SOH CAH TOA

$$\cos a = \frac{A}{H} = \frac{12}{20}$$

$$\frac{\cos a}{\cos} = \frac{12}{20}$$

$$a = \cos^{-1} \frac{12}{20}$$

$$a = 53.1^\circ$$

Summary

- 1) Always label the triangles first: opposite, adjacent, and hypotenuse
- 2) Figure out which ratio you need using SOH CAH TOA
- 3) Solve for the unknown angle or side

Homework: Worksheet

Using Trigonometry to Find Angle Measures

Find each angle measure to the nearest degree.

1) $\tan A = 2.0503$
 64°

2) $\cos Z = 0.1219$
 83°

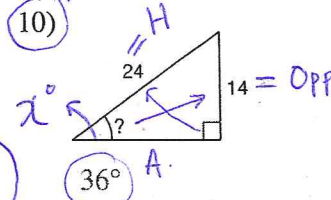
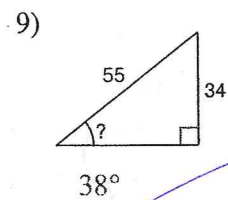
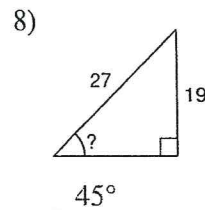
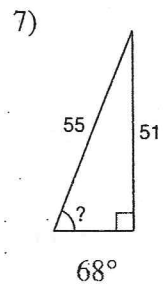
3) $\tan Y = 0.6494$
 33°

4) $\sin U = 0.8746$
 61°

5) $\cos V = 0.6820$
 47°

6) $\sin C = 0.2756$
 16°

Find the measure of the indicated angle to the nearest degree.

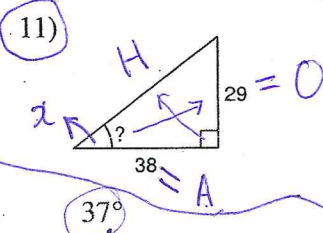


SO
H CA
H H T
A A

$$\sin x = \frac{O}{H} = \frac{14}{24}$$

$$\frac{\sin x}{\sin} = \frac{14}{24}$$

$$x = \sin^{-1}\left(\frac{14}{24}\right)$$

$$\therefore x = 35.7^\circ$$


$\tan x^\circ = \frac{O}{A} = \frac{29}{38}$

$$\tan x = \frac{29}{38}$$

$$x = \tan^{-1}\left(\frac{29}{38}\right)$$

$$x = 37.3^\circ$$
