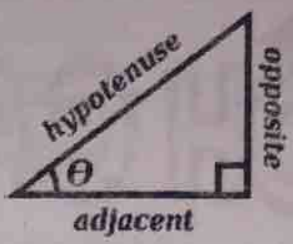
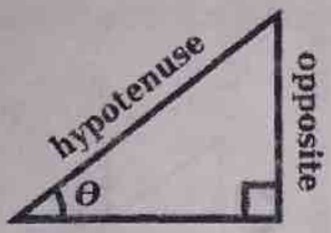
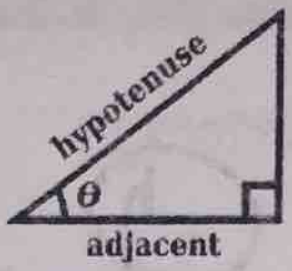
Right Triangle Trigonometry





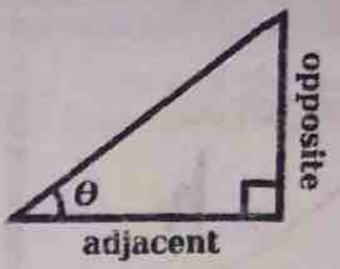
$$\text{Sin } \theta = \frac{\text{opposite}}{\text{hypotenuse}}$$

Some **O**ld **H**ippie



$$\text{Cos } \theta = \frac{\text{adjacent}}{\text{hypotenuse}}$$

Came **A** **H**oppin



$$\text{Tan } \theta = \frac{\text{opposite}}{\text{adjacent}}$$

Through **O**ur **A**partment

$\text{Sin}\theta = \frac{4}{12} = \frac{1}{3}$

$\text{Cos}\theta = \frac{9}{12} = \frac{3}{4}$

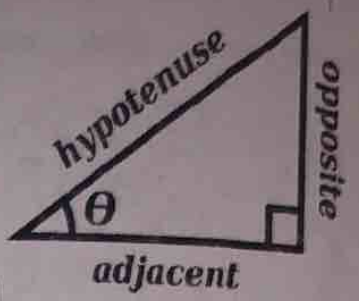
$\text{Tan}\theta = \frac{4}{9}$

$\text{Sin}(90-\theta) = \frac{9}{12} = \frac{3}{4}$

$\text{Cos}(90-\theta) = \frac{4}{12} = \frac{1}{3}$

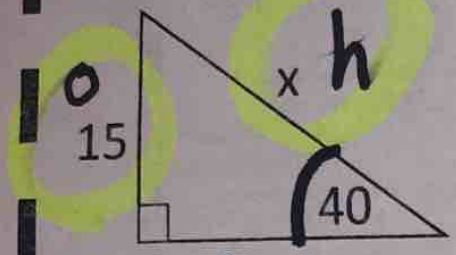
$\text{Tan}(90-\theta)$ $\frac{9}{4}$

Using SOH CAH TOA



Use Sine, Cosine, and Tangent to solve for missing sides or angles in right triangles.

Solve for x.



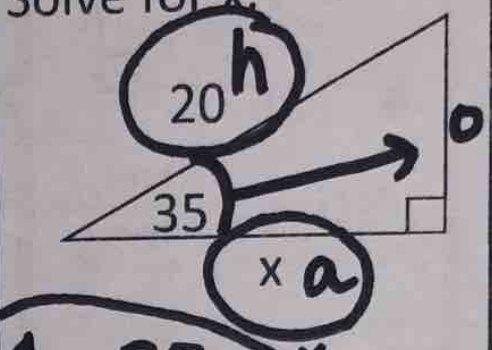
a

$\sin 40 = \frac{15}{x}$

$x = \frac{15}{\sin 40}$

$x = 23.33$

Solve for x.



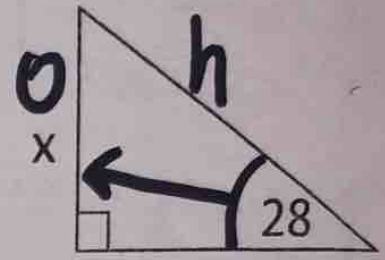
$\cos 35 = \frac{x}{20}$

$x = 16.38$

A

H

Solve for x.



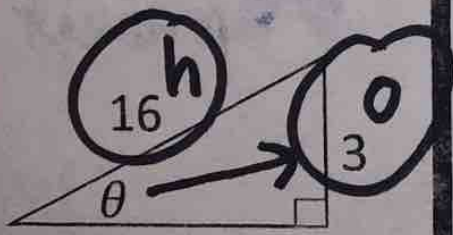
$\tan 28 = \frac{x}{10}$

5.32

O

A

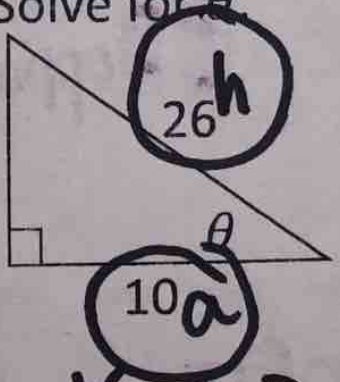
Solve for θ.



$\sin^{-1}(3/16)$

10.8069

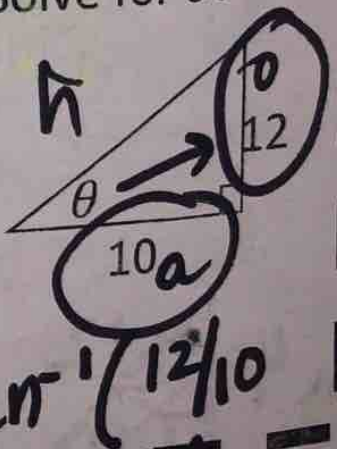
Solve for θ.



$\cos^{-1}(10/26)$

67.38

Solve for θ.

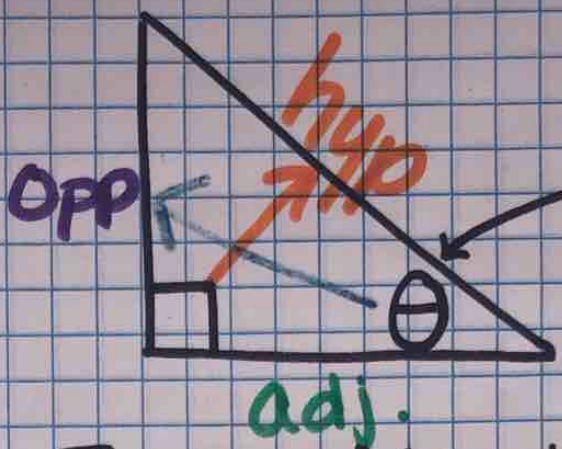


$\tan^{-1}(12/10)$

50.19

Some
Old
Hippie

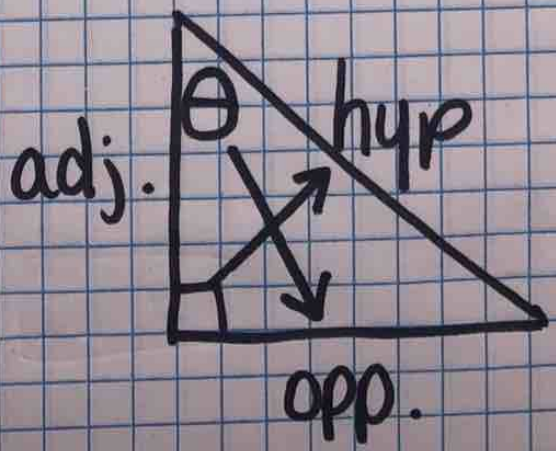
Came
A
Hoppin
Through
Our
Apartment



Finding Missing Sides

1. Label △ w/ Opp, hyp, adj
2. Circle what you have & what you need
3. Determine which function to use (Sine, Cosine, Tange
4. Set up Equation & Solve

* UP high, multiply Down Low, Switch & go

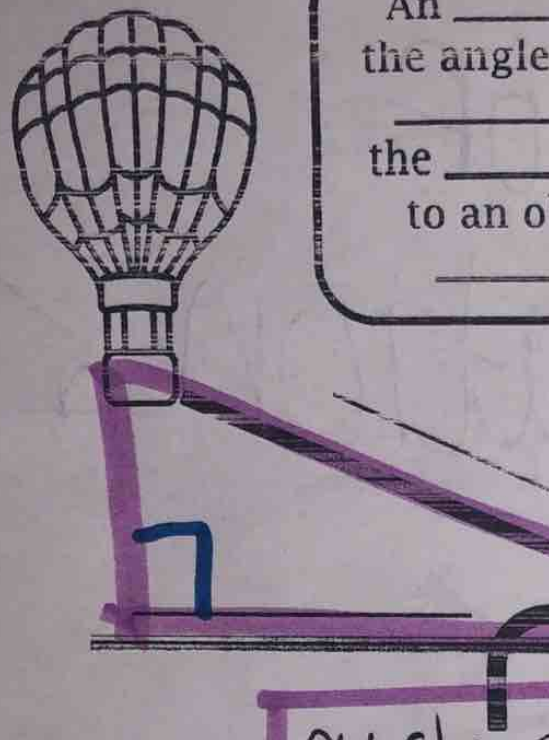


Angles of Elevation

bottom inside

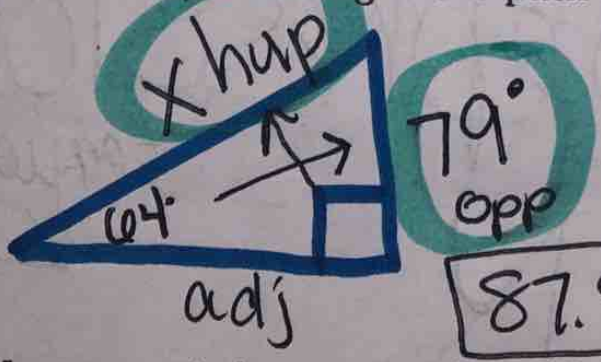
An _____ is the angle between the _____ and the _____ of _____ to an object when _____ _____.

The _____ of _____ is the imaginary path that your eyes follow when looking at an object.



angle of elevation

Example one: Lisa is standing at the bottom of a hill. The angle of elevation from her to the top of the hill is 64°. If the hill is 79 feet tall, how long is the path up the hill?

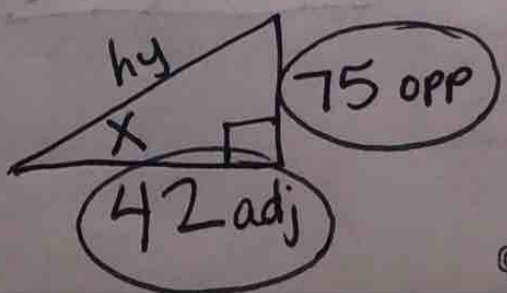


$\sin 64 = \frac{79}{x}$

$x = \frac{79}{\sin 64}$

87.9

Example two: A deer is standing 42 feet from the base of a 75 foot tall tree. What is the angle of elevation from her to a squirrel sitting on top of the tree?



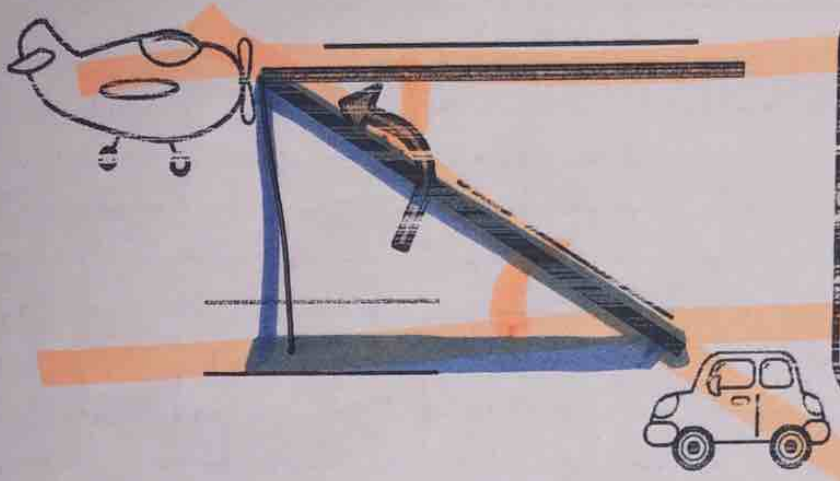
$\tan^{-1}(75/42)$

60.8°

*OUTSIDE Angles of Depression = ∠ of elevation

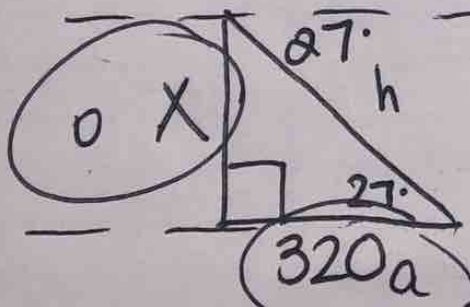
The triangle

An _____ is the angle between the _____ and the _____ of _____ to an object when _____ _____.



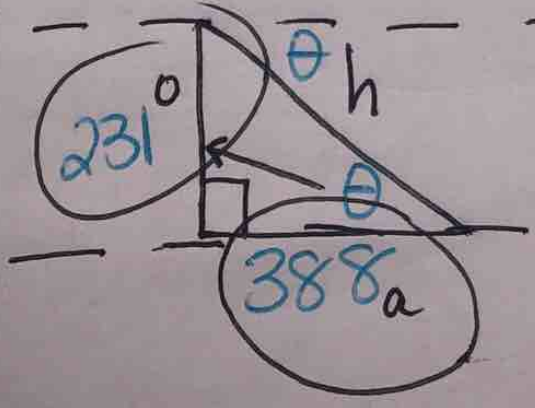
The _____ of _____ is the imaginary path that your eyes follow when looking at an object.

Example one: The angle of depression from a fisherman on top of a cliff to a boat 320 feet from the base of the cliff is 27°. How tall is the cliff?



$\tan 27 = \frac{x}{320}$ **163**

Example two: The tower of an ancient castle 231 feet tall and casts a shadow that is 388 feet long. What is the angle of depression that the sun makes with the ground to create the shadow?



$\tan^{-1}(231/388)$

30.8

(90-θ) means other ∠ **Guided Practice:** # Draw Pictures

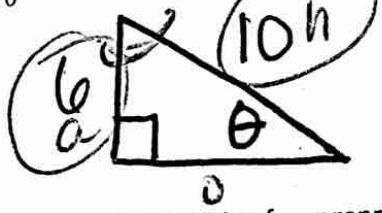
1. Let $\cos\theta = \frac{2}{5}$. What is the $\sin(90-\theta)^o$?

$\frac{2}{5}$

$\cos\theta = \frac{2}{5} \frac{a}{h}$

2. Let $\sin\theta = \frac{6}{10}$. What is the $\cos(90-\theta)^o$?

$\frac{6}{10} = \frac{o}{h}$

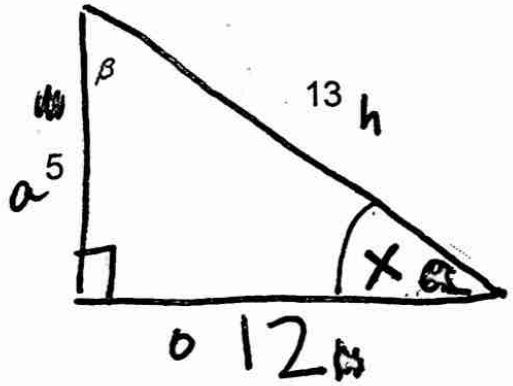


$\frac{6}{10}$

3a. Write the trigonometric function for α represented in the right triangle below.

b. What is the length of the missing leg of the triangle?

$5^2 + x^2 = 13^2$



Find the following values: $\cos\alpha =$ 12/13 $\tan\alpha =$ 5/12

$\sin\beta =$ 12/13 $\tan\beta =$ 12/5 $\frac{\sin\beta}{\cos\beta} =$

4. Given $\tan\alpha = \frac{7}{24}$, draw a right triangle that would represent this trigonometric ratio.

Find the following:

$\sin\alpha =$ 7/25

$\cos\alpha =$ 24/25

$\sin(90-\alpha) =$ 24/25

$\cos(90-\alpha) =$ 7/25