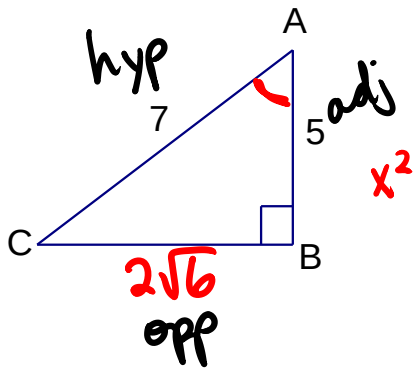
Algebra 2 Trig
Sect 13.1 Notes - Day 2

Name: Key

Directions: Find the six trigonometric RATIOS for the situation below – do not use your calculator!

1)



$x^2+5^2=7^2$
$x^2=24$
$x=\sqrt{24}$
$x=2\sqrt{6}$

sin ∠ A = $2\sqrt{6}/7$

cos ∠ A = $5/7$

tan ∠ A = $2\sqrt{6}/5$

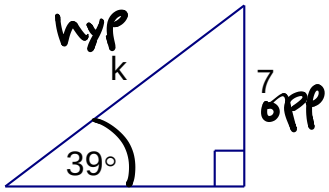
csc ∠ A = $7/2\sqrt{6} = 7\sqrt{6}/12$

sec ∠ A = $7/5$

cot ∠ A = $5/2\sqrt{6} = 5\sqrt{6}/12$

2) **Find k in each triangle below and round to the nearest tenth.**

a) k = _____

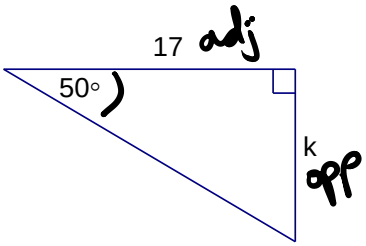


$\frac{\sin 39}{1} = \frac{7}{k}$

$k \cdot \sin 39 = 7$

$\boxed{k = 11.1}$

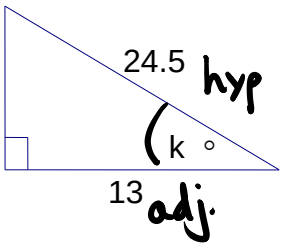
b) k = _____



$\frac{\tan 50}{1} = \frac{k}{17}$

$\boxed{k = 20.3}$

c) k = _____

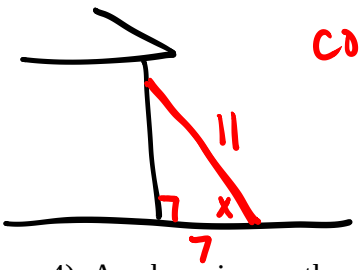


$\cos k = \frac{13}{24.5}$

$\cos^{-1}\left(\frac{13}{24.5}\right) = k$ $\boxed{k = 58.0°}$

Angle of Elevation vs. Angle of Depression

3) An 11 foot ladder is leaning against a house. The distance between the ladder and the house is 7 feet. What angle does the ladder make with the ground?

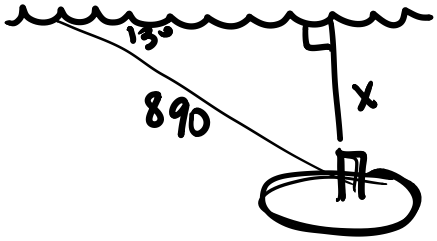


$\cos x = \frac{7}{11}$

$\cos^{-1}\left(\frac{7}{11}\right) = x$

$\boxed{x = 50.5°}$

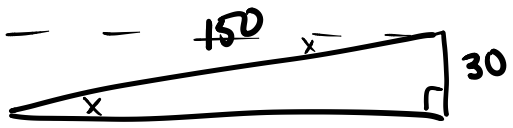
4) A submarine on the surface submerges, making an angle of 13º with the surface of the water. It travels diagonally at a distance of 890 meters before reaching the bottom. How deep is the water when the submarine reaches the bottom?



$\frac{\sin 13}{1} = \frac{x}{890}$

$\boxed{x = 200.2 \text{ m}}$

5) In a movie theater where the aisle is 150 feet long, the floor is sloped so there is an incline height of 30 feet. What is the angle of depression?



$\sin x = \frac{30}{150}$

$\sin^{-1}\left(\frac{30}{150}\right) = x$

$\boxed{x = 11.5°}$

6) A 151 foot tree is struck by lighting and snaps off 34 feet above the ground. The top part of the tree rests with the tip on the ground while the broken end rests on the top of the stump. What angle does the top part of the tree make with the ground?

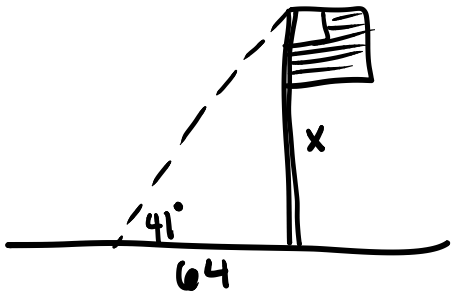
$151 - 34 = 117$

$\sin x = \frac{34}{117}$

$\sin^{-1}\left(\frac{34}{117}\right) = x$

$\boxed{x = 16.9°}$

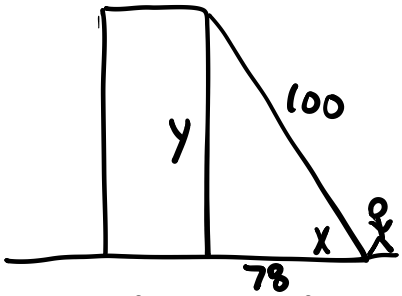
7) The sun shines on a flagpole, causing a shadow to be cast on the ground. The distance from the base of the pole to the tip of the shadow is 64 feet. At that time of the day, the sun's rays make an angle of 41° with the ground. How tall is the flagpole?



$\tan 41 = \frac{x}{64}$

$\boxed{x = 55.6 \text{ ft}}$

8) An observer is standing 78 feet from the base of a building. The distance between where the observer is standing and the top of the building is 100 feet. What is the angle of elevation to the top of the building? To the nearest foot, how high is the building?



$\cos x = \frac{78}{100}$

$\boxed{x = 38.7°}$

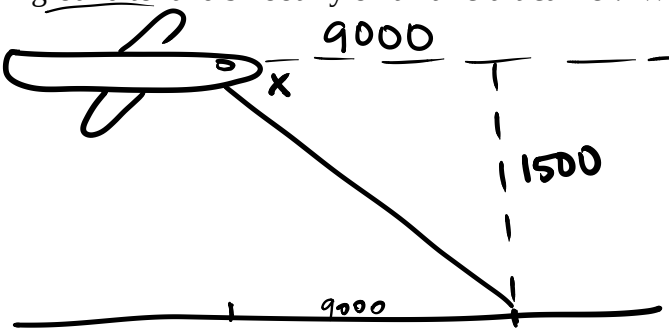
use pythagorean thm

$78^2 + x^2 = 100^2$

$x^2 = 3916$

$\boxed{x = 62.6 \text{ ft}}$

9) An air force pilot is flying at an altitude of 1500 feet and must descend over a distance of 9000 feet on the ground to land smoothly on an aircraft carrier. What is the plane's angle of descent?



$\tan x = \frac{1500}{9000}$

$\boxed{x = 9.46°}$