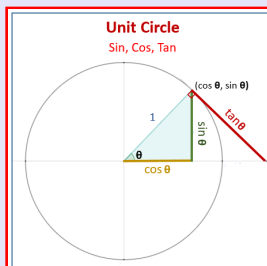


# Trigonometry

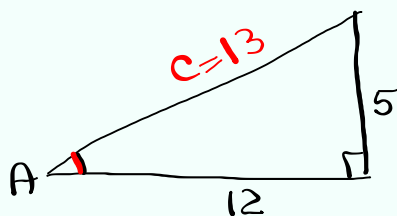
## Lecture 7



Feb 19-8:47 AM

Class Quiz 2

Given



1) Find hypotenuse.

$$a^2 + b^2 = c^2$$

$$5^2 + 12^2 = c^2$$

$$c^2 = 169$$

$$c = 13$$

2) Find

$$\sin A = \frac{5}{13}$$

$$\csc A = \frac{13}{5}$$

$$\cos A = \frac{12}{13}$$

$$\sec A = \frac{13}{12}$$

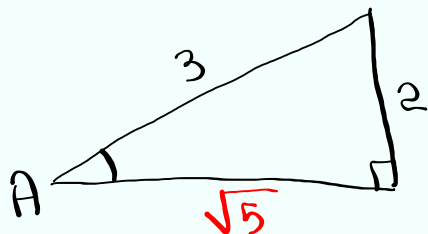
$$\tan A = \frac{5}{12}$$

$$\cot A = \frac{12}{5}$$

Box Your  
Answers

Sep 5-10:21 AM

Consider the triangle below



1) Find the missing leg.

$$a^2 + b^2 = c^2$$

$$2^2 + b^2 = 3^2$$

$$b^2 = 5$$

$$b = \sqrt{5}$$

2) Find

$$\sin A = \frac{2}{3}$$

$$\csc A = \frac{3}{2}$$

$$\cos A = \frac{\sqrt{5}}{3}$$

$$\sec A = \frac{3\sqrt{5}}{5}$$

$$\tan A = \frac{2\sqrt{5}}{5}$$

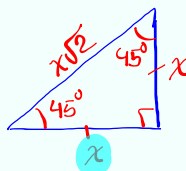
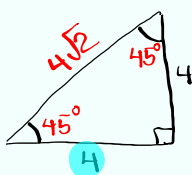
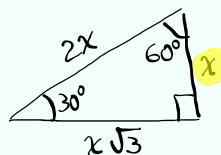
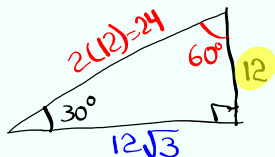
$$\cot A = \frac{\sqrt{5}}{2}$$

$$\frac{3}{\sqrt{5}} \cdot \frac{\sqrt{5}}{\sqrt{5}} = \frac{3\sqrt{5}}{5}$$

$$\frac{2}{\sqrt{5}} \cdot \frac{\sqrt{5}}{\sqrt{5}} = \frac{2\sqrt{5}}{5}$$

Sep 5-10:37 AM

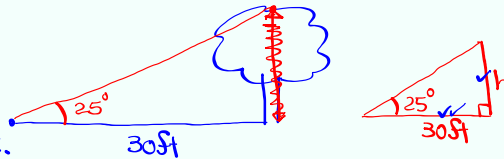
Find missing sides & angles



	0°	30°	45°	60°	90°
Sin	0	$\frac{1}{2}$	$\frac{\sqrt{2}}{2}$	$\frac{\sqrt{3}}{2}$	1
Cos	1	$\frac{\sqrt{3}}{2}$	$\frac{\sqrt{2}}{2}$	$\frac{1}{2}$	0
tan	0	$\frac{\sqrt{3}}{3}$	1	$\sqrt{3}$	und.

Sep 5-10:44 AM

The angle of elevation from ground to top of tree is  $25^\circ$  from a point 30 ft from the tree. How tall is the tree?



Use Calc.

$$\tan 45^\circ = 1$$

$$\sin 30^\circ = \frac{1}{2}$$

$$\tan 60^\circ \approx 1.732$$

$$\tan 25^\circ = \frac{h}{30}$$

Cross-Multiply

$$h = 30 \cdot \tan 25^\circ$$

$$h \approx 13.989$$

$$\approx 14$$

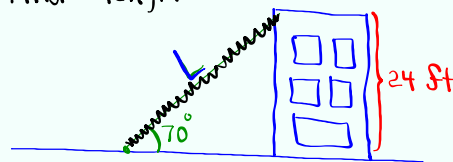
$$\boxed{14 \text{ ft}}$$

Sep 5-10:57 AM

We need a ladder to reach the top of a building that is 24 ft high.

From a point to place the ladder on the ground, the angle of elevation to the top of the building was  $70^\circ$ .

Find length of the ladder.



$$\sin 70^\circ = \frac{24}{L}$$

$$L \cdot \sin 70^\circ = 24$$

$$L = \frac{24}{\sin 70^\circ}$$

$$L \approx 25.540$$

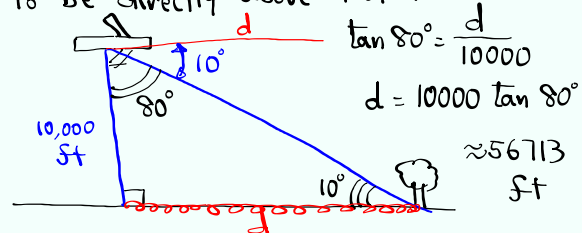
$$L \approx \boxed{26 \text{ ft}}$$

Sep 5-11:05 AM

A plane is flying at the height of 10000 ft.

The plane spots a tree on the ground with angle of depression of  $10^\circ$ .

Find the distance that plane has to fly to be directly above that tree.



$$\tan 10^\circ = \frac{10000}{d}$$

$$d \cdot \tan 10^\circ = 10000$$

$$d = \frac{10000}{\tan 10^\circ}$$

$$d \approx 56713 \text{ ft}$$

Sep 5-11:13 AM

Solve  $3x^2 - 2 = 3$

$$3x^2 = 5$$

$$x^2 = \frac{5}{3}$$

Square-Root Method

If  $u^2 = k$ , then  $u = \pm \sqrt{k}$

$$\Rightarrow x = \pm \sqrt{\frac{5}{3}} = \pm \frac{\sqrt{5}}{\sqrt{3}} \cdot \frac{\sqrt{3}}{\sqrt{3}}$$

$$x = \pm \frac{\sqrt{15}}{3}$$

$$\left\{ \pm \frac{\sqrt{15}}{3} \right\}$$

Sep 5-11:23 AM

Solve  $2(3x+4)^2=8$

Divide by 2  $\rightarrow (3x+4)^2=4$

Use S.R.M.

$$3x+4 = \pm\sqrt{4}$$

$$3x = -4 \pm 2$$

$$x = \frac{-4 \pm 2}{3}$$

$$x = \frac{-4+2}{3} = \frac{-2}{3}$$

$$x = \frac{-4-2}{3} = -2$$

$$\left\{-2, \frac{-2}{3}\right\}$$

Sep 5-11:27 AM

Solve using quadratic formula

$$4x^2 + 9 = 6x$$

$$ax^2+bx+c=0$$

$$4x^2 - 6x + 9 = 0$$

$$\uparrow$$
  
 $a=4$

$$\uparrow$$
  
 $b=-6$

$$\uparrow$$
  
 $c=9$

$$b^2-4ac=$$

$$(-6)^2-4(4)(9)=$$

$$x = \frac{-b \pm \sqrt{b^2-4ac}}{2a} = \frac{-(-6) \pm \sqrt{-4}}{2 \cdot 4} \quad \begin{matrix} 36-144= \\ -108 \end{matrix}$$

No real Solutions

Solutions are Complex numbers

$$a + bi$$

$$i = \sqrt{-1}$$

Sep 5-11:30 AM

Solve by Quadratic formula

$$9x^2 + 4 = 12x$$

$$9x^2 - 12x + 4 = 0$$

$$a=9$$

$$b=-12$$

$$c=4$$

$$b^2 - 4ac = (-12)^2 - 4(9)(4) = 0$$

$$x = \frac{-b \pm \sqrt{b^2 - 4ac}}{2a} = \frac{-(-12) \pm \sqrt{0}}{2(9)}$$

$$= \frac{12 \pm 0}{18} = \frac{12}{18} = \left\{ \frac{2}{3} \right\}$$

$$\left\{ \frac{2}{3} \right\}$$

Sep 5-11:39 AM