

Δ's show up a lot

5-12-13

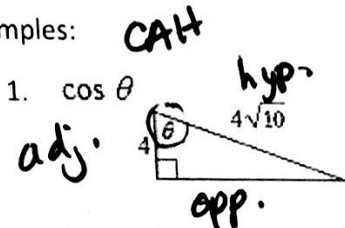
3-4-5

## 7.2N - Right Triangle Trigonometry

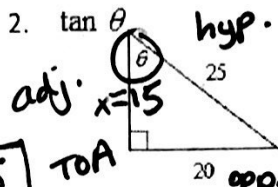
### A. Finding values of trig functions (sine, cosine, tangent, cosecant, secant, and cotangent).

- Do you remember SOH CAH TOA?  $\sin \theta = \frac{\text{opposite}}{\text{hypotenuse}}$   $\cos \theta = \frac{\text{adjacent}}{\text{hypotenuse}}$   $\tan \theta = \frac{\text{opposite}}{\text{adjacent}}$

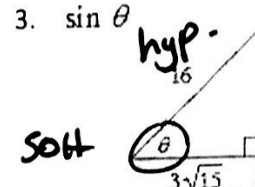
Examples:



$$\cos \theta = \frac{4}{4\sqrt{10}} = \frac{1}{\sqrt{10}} = \frac{\sqrt{10}}{10}$$



$$\tan \theta = \frac{20}{15} = \frac{4}{3}$$



$$\sin \theta = \frac{16}{16\sqrt{21}}$$

Pythag. Thm  
 $x^2 + (3\sqrt{15})^2 = 25^2$   
 $x^2 = 25^2 - 20^2$   
 $x^2 = 225$   
 $x = \sqrt{225} = 15$

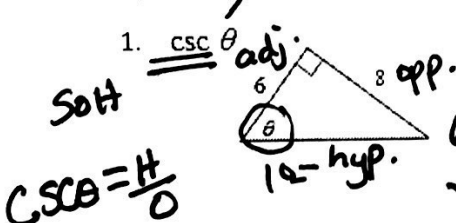
- There are 3 other trig functions... cosecant, secant, and cotangent.
- They are defined as follows:

$$\csc \theta = \frac{1}{\sin \theta} = \frac{\text{hyp.}}{\text{opp.}}$$

$$\sec \theta = \frac{1}{\cos \theta} = \frac{\text{hyp.}}{\text{adj.}}$$

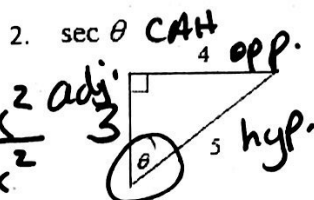
$$\cot \theta = \frac{1}{\tan \theta} = \frac{\text{adj.}}{\text{opp.}}$$

Examples:

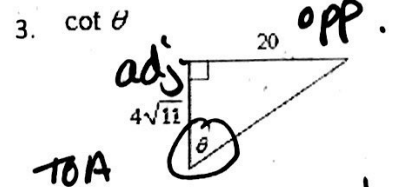


$$\csc \theta = \frac{10}{6} = \frac{5}{3}$$

$$\csc \theta = \frac{10}{6} = \frac{5}{3}$$



$$\sec \theta = \frac{5}{3}$$



$$\cot \theta = \frac{20}{4\sqrt{11}} = \frac{5\sqrt{11}}{5}$$

### B. Use your calculator (make sure it is in degree mode)

Examples: Round your answers to the nearest ten-thousandth. 4 decimal places

1.  $\sin 41^\circ = 0.6561$

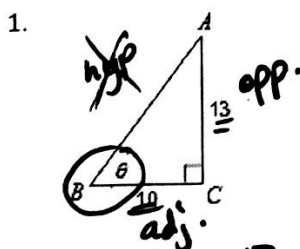
2.  $\cot 92^\circ = -0.0349$

3.  $\sec 23^\circ = 1.0864$

### C. Using inverse trig functions

Find the measure of each angle indicated. Round to the nearest tenth. use  $\sin^{-1}$   $\cos^{-1}$   $\tan^{-1}$

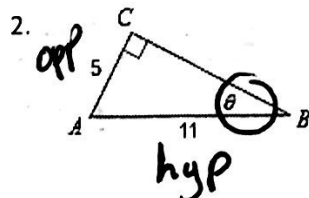
Examples:



$$\tan \theta = \frac{13}{10}$$

$$\theta = \tan^{-1}\left(\frac{13}{10}\right)$$

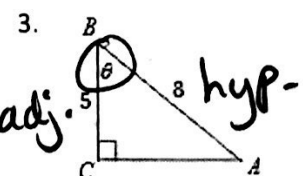
$$\theta = 52.4^\circ$$



$$\sin \theta = \frac{5}{11}$$

$$\theta = \sin^{-1}\left(\frac{5}{11}\right)$$

$$\theta = 27^\circ$$



$$\cos \theta = \frac{5}{8}$$

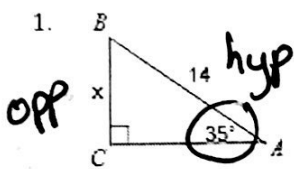
$$\theta = \cos^{-1}\left(\frac{5}{8}\right)$$

$$\theta = 51.3^\circ$$

D. Finding missing side lengths

Find the measure of each side indicated. Round to the nearest tenth. SOH CAH TOA

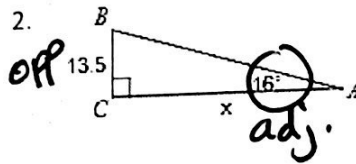
Examples:



$$\frac{\sin 35}{1} = \frac{x}{14}$$

$$x = 14 \sin 35$$

$$\boxed{x = 8}$$

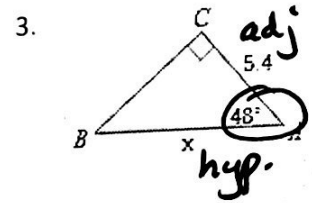


$$\frac{\tan 16}{1} = \frac{13.5}{x}$$

$$x \cdot \tan 16 = 13.5$$

$$\frac{x \cdot \tan 16}{\tan 16} = \frac{13.5}{\tan 16}$$

$$\boxed{x = 47.1}$$



$$\frac{\cos 48}{1} = \frac{5.4}{x}$$

$$x \cos 48 = 5.4$$

$$\frac{x \cos 48}{\cos 48} = \frac{5.4}{\cos 48}$$

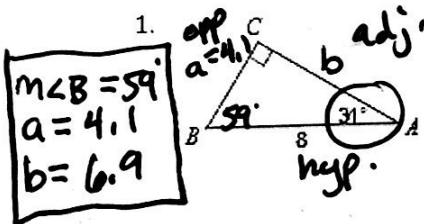
$$\boxed{x = 8.1}$$

E. Solve a triangle

Solve each triangle. Round answers to the nearest tenth.

Examples:

\* Pick angle & label  $\Delta$ !



$$\boxed{\begin{matrix} m\angle B = 59^\circ \\ a = 4.1 \\ b = 6.9 \end{matrix}}$$

$$m\angle B = 180 - 31 - 90$$

$$m\angle B = 59^\circ$$

$$\frac{\sin 31}{1} = \frac{a}{8}$$

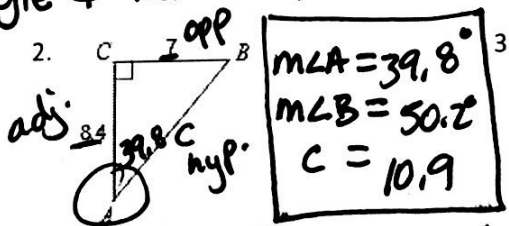
$$a = 8 \sin 31$$

$$a = 4.1$$

$$\frac{\cos 31}{1} = \frac{b}{8}$$

$$b = 8 \cos 31$$

$$b = 6.9$$



$$\boxed{\begin{matrix} m\angle A = 39.8^\circ \\ m\angle B = 50.2^\circ \\ c = 10.9 \end{matrix}}$$

$$\tan A = \frac{7}{8.4} \quad \text{Find angle use tan}^{-1}$$

$$A = \tan^{-1}\left(\frac{7}{8.4}\right)$$

$$\boxed{A = 39.8^\circ}$$

$$m\angle B = 180 - 39.8 - 90$$

$$m\angle B = 50.2^\circ$$

$$8.4^2 + 7^2 = c^2$$

$$10.9 = c$$

