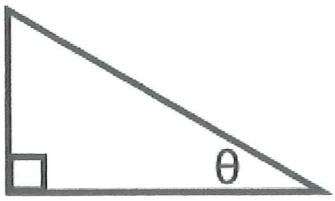
Key for notes and HW :)

**13.1 Right Triangle Trigonometry Notes**

Using these sides, you can define six **trigonometric functions: sine, cosine, tangent, cosecant, secant,** and **cotangent.** These functions are abbreviated sin, cos, tan, csc, sec, and cot, respectively.




## KEY CONCEPT — *Trigonometric Functions*

If $\theta$ is the measure of an acute angle of a right triangle, *opp* is the measure of the leg opposite $\theta$, *adj* is the measure of the leg adjacent to $\theta$, and *hyp* is the measure of the hypotenuse, then the following are true.

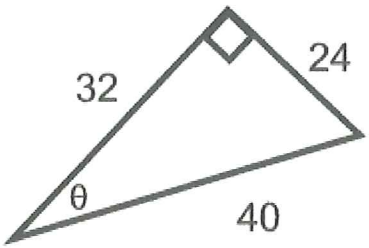
$$\sin\theta = \frac{\text{opp}}{\text{hyp}} \qquad \cos\theta = \frac{\text{adj}}{\text{hyp}} \qquad \tan\theta = \frac{\text{opp}}{\text{adj}}$$

$$\csc\theta = \frac{\text{hyp}}{\text{opp}} \qquad \sec\theta = \frac{\text{hyp}}{\text{adj}} \qquad \cot\theta = \frac{\text{adj}}{\text{opp}}$$

Notice that the sine, cosine, and tangent functions are reciprocals of the cosecant, secant, and cotangent functions, respectively. Thus, the following are also true.

$$\csc\theta = \frac{1}{\sin\theta} \qquad \sec\theta = \frac{1}{\cos\theta} \qquad \cot\theta = \frac{1}{\tan\theta}$$

**Ex1** Find the 6 trigonometric ratios.




$\sin\theta = \frac{24}{40}$ → $\sin\theta = \frac{3}{5}$

$\csc\theta = \frac{40}{24}$ → $\csc\theta = \frac{5}{3}$

$\cos\theta = \frac{32}{40}$ → $\cos\theta = \frac{4}{5}$

$\sec\theta = \frac{40}{32}$ → $\sec\theta = \frac{5}{4}$

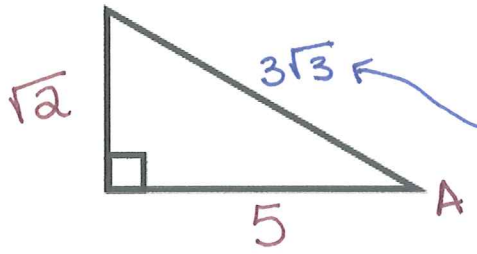
$\tan\theta = \frac{24}{32}$ → $\tan\theta = \frac{3}{4}$

$\cot\theta = \frac{32}{24}$ → $\cot\theta = \frac{4}{3}$

**Ex 2** If tan A = $\frac{\sqrt{2}}{5}$, then find csc A.

$\csc\theta = \frac{h}{o}$

∴ we need to find the hypotenuse by Pythagorean theorem.




$(\sqrt{2})^2 + 5^2 = h^2$

$\sqrt{27} = h$

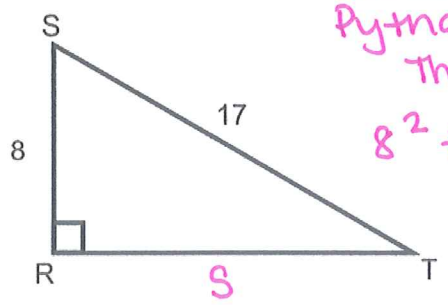
$3\sqrt{3} = h$

$\csc\theta = \frac{3\sqrt{3}}{\sqrt{2}} \cdot \frac{\sqrt{2}}{\sqrt{2}}$

* can't have radical in denom *

$\csc A = \frac{3\sqrt{6}}{2}$

**Ex 3** Solve ΔRST. Round measures of sides to nearest tenth and angle measures to nearest degree.




Find RT

Pythagorean Theorem

$8^2 + S^2 = 17^2$

$S = 15$

Find ∠T

$\sin T = \frac{8}{17}$

$\angle T = \sin^{-1}\left(\frac{8}{17}\right)$

$\angle T \approx 28°$

Find ∠S

$\cos S = \frac{8}{17}$

$\angle S = \cos^{-1}\left(\frac{8}{17}\right)$

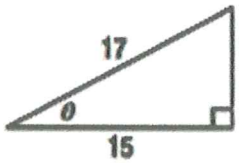
$\angle S \approx 62°$

Remember

" Solve the Δ" means find all that is missing.

HOMEWORK: Show your work on a separate paper.

**1. Find the values of the six trigonometric functions for angle $\theta$.**




**2. Standardized Test Practice**

**If $\sin A = \frac{7}{10}$, find the value of $\cos A$.**

**A.** $\frac{7\sqrt{149}}{149}$ **B.** $\frac{\sqrt{51}}{10}$ **C.** $\frac{10}{7}$ **D.** $\frac{\sqrt{51}}{7}$

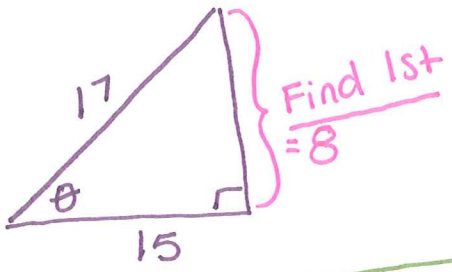
**3. Solve $\Delta ABC$ if $A = 20°$, $C = 90°$, and $b = 10$. Round measures of sides to the nearest tenth and measures of angles to the nearest degree.**

# Homework 13.1 (ACC Geometry)

1.) Find the values of the six trig functions for angle $\theta$.

$15^2 + x^2 = 17^2$

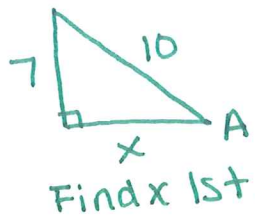
$x = 8$




$\sin\theta = \frac{8}{17}$ $\quad \csc\theta = \frac{17}{8}$ $\quad \cos\theta = \frac{15}{17}$ $\quad \sec\theta = \frac{17}{15}$

$\tan\theta = \frac{8}{15}$ $\quad \cot\theta = \frac{15}{8}$

2.) If $\sin A = \frac{7}{10}$, find the value of $\cos A$.

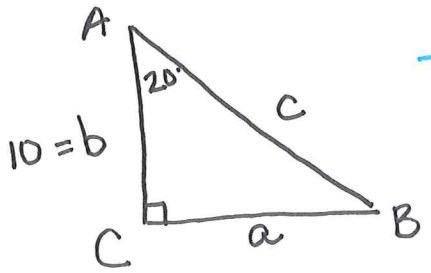



$7^2 + x^2 = 10^2$

$x = \sqrt{51}$

$\cos A = \frac{\sqrt{51}}{10}$

3.) Solve $\triangle ABC$ if $\angle A = 20°$, $\angle C = 90°$ and $b = 10$.




Find $\angle B$

$\triangle$ sum

$\angle B = 70°$

Find $a$

$\tan 20 = \frac{a}{10}$

$a \approx 3.6$ units

Find $c$

$\cos 20 = \frac{10}{c}$

$c \approx 10.6$ units

$\angle B = 70°$
$a \approx 3.6$
$b = 10$
$c \approx 10.6$