

Name Student

AMDG

Acc Alg 2 - 2

15: Acute Angles and Right Triangles

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15.1: Trigonometric Functions of Acute Angles

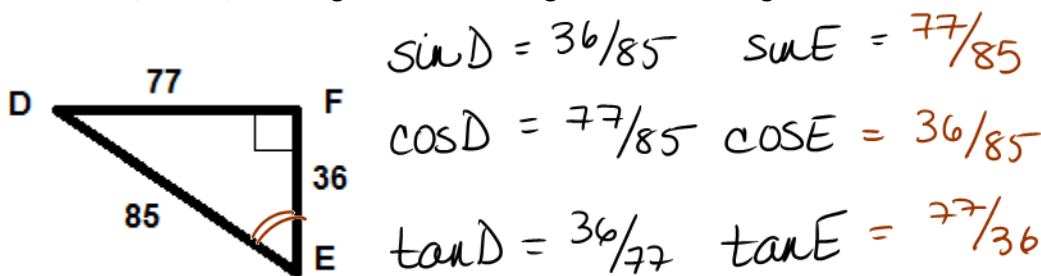


$$\begin{aligned}\sin \theta &= \frac{y}{r}, \csc \theta = \frac{r}{y} \\ \cos \theta &= \frac{x}{r}, \sec \theta = \frac{r}{x} \\ \tan \theta &= \frac{y}{x}, \cot \theta = \frac{x}{y}\end{aligned}$$

$$\left[\begin{array}{l} \sin \theta = \frac{\text{opp}}{\text{hyp}} \\ \cos \theta = \frac{\text{adj}}{\text{hyp}} \\ \tan \theta = \frac{\text{opp}}{\text{adj}} \end{array} \right. \text{ in a rt } \Delta$$

SOH CAH TOA

1. Find the sine, cosine, and tangent values for angles D & E in the figure:



2. Write the function in terms of its cofunction.

a. $\sin 9^\circ = \cos 81^\circ$

b. $\cot 76^\circ = \tan 14^\circ$

c. $\csc 45^\circ = \sec 45^\circ$

$$\begin{aligned}\sin \theta &= \cos (90 - \theta)^\circ & \csc \theta &= \sec (90 - \theta)^\circ \\ \cos \theta &= \sin (90 - \theta)^\circ & \sec \theta &= \csc (90 - \theta)^\circ \\ \tan \theta &= \cot (90 - \theta)^\circ & \cot \theta &= \tan (90 - \theta)^\circ\end{aligned}$$

3. Find one solution for each equation. Assume all angles involved are acute.

iff: if & only if
 $\Leftrightarrow$ by defin.

Cofunctions $\Rightarrow$ eq true iff $\angle s = 90^\circ$

a. $\cot(\theta - 8)^\circ = \tan(4\theta + 13)^\circ$ true iff $(\theta - 8) + (4\theta + 13) = 90$
 $5\theta + 5 = 90$
 $5\theta = 85$
 $\theta = 17^\circ$

b. $\sec(5\theta + 14)^\circ = \csc(2\theta - 8)^\circ$
 true iff $5\theta + 14 + 2\theta - 8 = 90$
 $7\theta + 6 = 90$, $7\theta = 84$
 $\theta = 12^\circ$

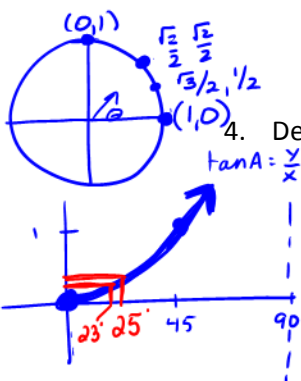
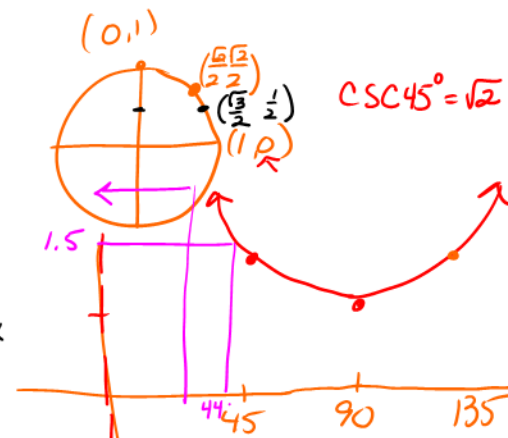
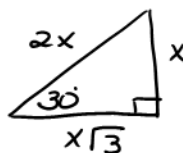
4. Determine whether each statement is true or false.

a. $\tan(25)^\circ < \tan(23)^\circ \therefore$ FALSE

b. $\csc 44^\circ < \csc 40^\circ \therefore$ TRUE

5. Find the six trigonometric function values for a 30° angle.

$$\begin{aligned}\sin 30^\circ &= 1/2 & \csc 30^\circ &= 2 \\ \cos 30^\circ &= \sqrt{3}/2 & \sec 30^\circ &= 2/\sqrt{3} \\ \tan 30^\circ &= 1/\sqrt{3} & \cot 30^\circ &= \sqrt{3}\end{aligned}$$



15.2: Trigonometric Functions of Non-Acute Angles

6. Find the reference angle for each angle.

drawn to x-axis

a. $294^\circ \Rightarrow 66^\circ$

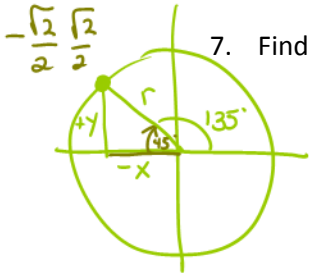


b. $883^\circ \Rightarrow 17^\circ$
 $\frac{-120}{163}$



$180 - 163 = 17^\circ$

7. Find the values of the 6 trig functions for 135°

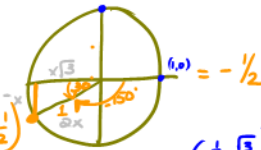


$\sin 135^\circ = \frac{\sqrt{2}}{2}$
 $\cos 135^\circ = -\frac{\sqrt{2}}{2}$
 $\tan 135^\circ = -1$

$\csc 135^\circ = \sqrt{2}$
 $\sec 135^\circ = -\sqrt{2}$
 $\cot 135^\circ = -1$

8. Find the exact value of each expression

a. $\sin(-150)^\circ$

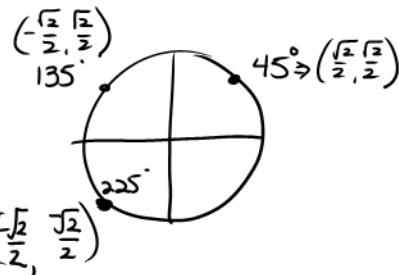


b. $\cot 780^\circ$

$\cot 780^\circ = \cot 60^\circ = \frac{1}{\sqrt{3}}$
 $\cot = \frac{A}{H} = \frac{x}{y}$

9. Evaluate $\sin^2 45^\circ + 3 \cos^2 135^\circ - 2 \tan 225^\circ$

$\left(\frac{\sqrt{2}}{2}\right)^2 + 3 \left(-\frac{\sqrt{2}}{2}\right)^2 - 2(1)$
 $\frac{1}{2} + 3\left(\frac{1}{2}\right) - 2$
 $\frac{1}{2} + \frac{3}{2} - 2 = 0$

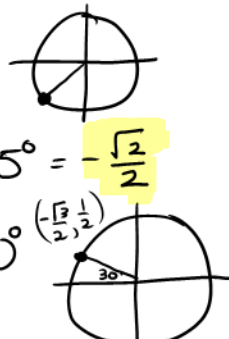


10. Evaluate each function by first expressing the function in terms of an angle between 0° and

360° .

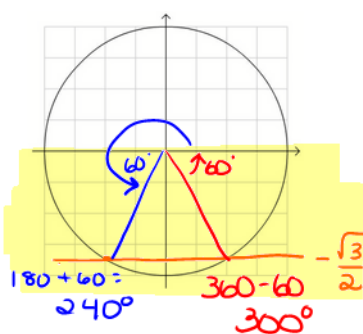
a. $\sin 585^\circ \Rightarrow \sin 225^\circ = -\frac{\sqrt{2}}{2}$

b. $\cot(-930)^\circ \Rightarrow \cot 150^\circ$
 $+3(360)$



$\cot \theta = \frac{\cos \theta}{\sin \theta} \therefore \cot 150 = \frac{\cos 150}{\sin 150} = \frac{-\frac{\sqrt{3}}{2}}{\frac{1}{2}} = -\sqrt{3}$

11. Find all values of θ , if θ is in the interval $[0^\circ, 360^\circ)$ and $\sin \theta = -\frac{\sqrt{3}}{2}$. $\Rightarrow y < 0 \therefore Q = 3 \& 4$



includes $\rightarrow 240^\circ \& 300^\circ$
 does not include