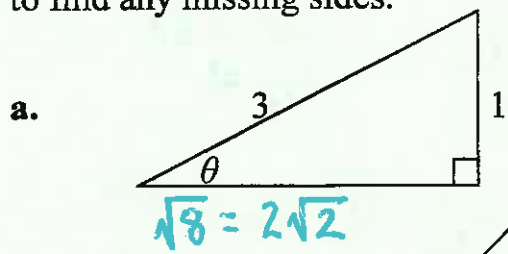
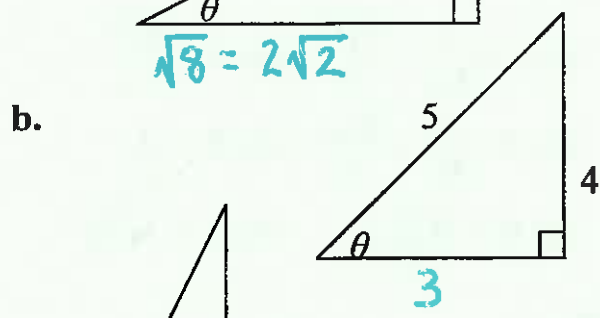


Practice 7.4: Trig Functions & Right Triangles

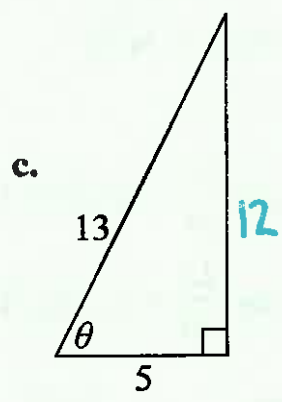
1. Find the exact value of the six trig functions of the angle θ . Use the Pythagorean thm to find any missing sides.



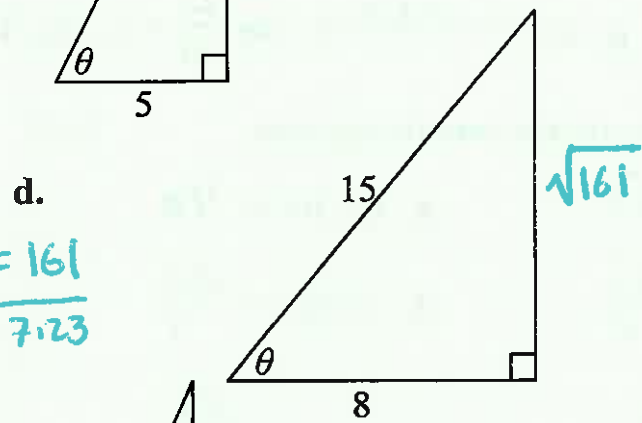
$$\begin{aligned} \sin \theta &= \frac{1}{3} & \csc \theta &= 3 \\ \cos \theta &= \frac{2\sqrt{2}}{3} & \sec \theta &= \frac{3}{2\sqrt{2}} = \frac{3\sqrt{2}}{4} \\ \tan \theta &= \frac{\sqrt{2}}{2} = \frac{1}{\sqrt{2}} & \cot \theta &= 2\sqrt{2} \end{aligned}$$



$$\begin{aligned} \sin \theta &= \frac{4}{5} & \csc \theta &= \frac{5}{4} \\ \cos \theta &= \frac{3}{5} & \sec \theta &= \frac{5}{3} \\ \tan \theta &= \frac{4}{3} & \cot \theta &= \frac{3}{4} \end{aligned}$$

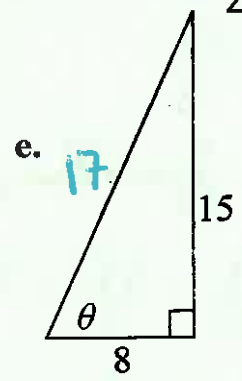


$$\begin{aligned} \sin \theta &= \frac{12}{13} & \csc \theta &= \frac{13}{12} \\ \cos \theta &= \frac{5}{13} & \sec \theta &= \frac{13}{5} \\ \tan \theta &= \frac{12}{5} & \cot \theta &= \frac{5}{12} \end{aligned}$$

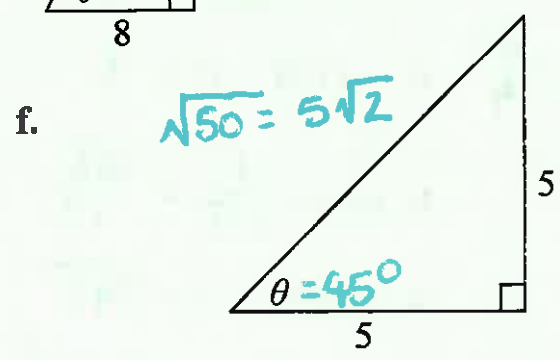


$$\begin{aligned} 15^2 - 8^2 &= 161 \\ \sqrt{161} &= \sqrt{7 \cdot 23} \end{aligned}$$

$$\begin{aligned} \sin \theta &= \frac{\sqrt{161}}{15} & \csc \theta &= \frac{15}{\sqrt{161}} = \frac{5\sqrt{161}}{161} \\ \cos \theta &= \frac{8}{15} & \sec \theta &= \frac{15}{8} \\ \tan \theta &= \frac{\sqrt{161}}{8} & \cot \theta &= \frac{8}{\sqrt{161}} = \frac{8\sqrt{161}}{161} \end{aligned}$$



$$\begin{aligned} \sin \theta &= \frac{15}{17} & \csc \theta &= \frac{17}{15} \\ \cos \theta &= \frac{8}{17} & \sec \theta &= \frac{17}{8} \\ \tan \theta &= \frac{15}{8} & \cot \theta &= \frac{8}{15} \end{aligned}$$



$$\begin{aligned} \sin \theta &= \frac{5}{5\sqrt{2}} = \frac{\sqrt{2}}{2} & \csc \theta &= \frac{5\sqrt{2}}{5} = \sqrt{2} \\ \cos \theta &= \frac{\sqrt{2}}{2} & \sec \theta &= \sqrt{2} \\ \tan \theta &= 1 & \cot \theta &= 1 \end{aligned}$$

2. Sketch a right triangle corresponding to the trig function of the angle θ . Use the Pythagorean thm to find the missing side and then find the indicated trig functions.

a. $\sin \theta = \frac{2}{3}$

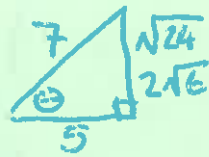


$\cos \theta = \frac{\sqrt{5}}{3}$

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

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

b. $\cos \theta = \frac{5}{7}$

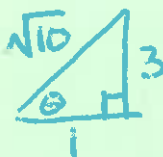


$\sin \theta = \frac{2\sqrt{6}}{7}$

$\tan \theta = \frac{2\sqrt{6}}{5}$

$\cot \theta = \frac{5}{2\sqrt{6}} = \frac{5\sqrt{6}}{12}$

c. $\tan \theta = \frac{3}{1}$

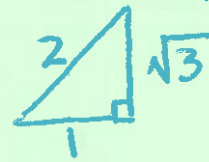


$\sin \theta = \frac{3}{\sqrt{10}} = \frac{3\sqrt{10}}{10}$

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

$\csc \theta = \frac{\sqrt{10}}{3}$

d. $\sec \theta = \frac{2}{1}$



$\sin \theta = \frac{\sqrt{3}}{2}$

$\cos \theta = \frac{1}{2}$

$\tan \theta = \sqrt{3}$

3. Use a calculator to evaluate the trig functions.

a. $\sin 10^\circ = 0.1736$ b. $\tan 50^\circ = 1.19$ c. $\sec 89^\circ = 57.3$ d. $\sin \frac{3\pi}{10} = 0.809$

e. $\cos 80^\circ = 0.1736$ f. $\cot 40^\circ = 1.19$ g. $\csc 1^\circ = 57.3$ h. $\cos \frac{2\pi}{10} = 0.809$

Use the value of the given function to evaluate the remaining ones.

$\tan = \frac{\sin}{\cos}$

4. $\sin 60^\circ = \frac{\sqrt{3}}{2}$

$\cos 60^\circ = \frac{1}{2}$

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

$\tan 30^\circ = \frac{\sqrt{3}}{3}$

6. $\csc \theta = 3$

$\sec \theta = \frac{3\sqrt{2}}{4}$

7. $\sec \theta = 5$

$\tan \theta = 2\sqrt{6}$

$\cos \cdot \tan = \frac{\sin}{\cos}$

a. $\tan 60^\circ = \sqrt{3}$

c. $\cos 30^\circ = \frac{\sqrt{3}}{2}$

a. $\csc 30^\circ = 2$

c. $\cos 30^\circ = \frac{\sqrt{3}}{2}$

a. $\sin \theta = \frac{1}{3}$

c. $\tan \theta = \frac{1/3}{2\sqrt{2}/3} = \frac{1}{2\sqrt{2}} = \frac{\sqrt{2}}{4}$

a. $\cos \theta = \frac{1}{5}$

c. $\sin \theta = \frac{2\sqrt{6}}{5}$

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

d. $\cot 60^\circ = \frac{\sqrt{3}}{3}$

b. $\cot 60^\circ = \frac{\sqrt{3}}{3}$

d. $\cot 30^\circ = \frac{3}{\sqrt{3}} = \sqrt{3}$

b. $\cos \theta = \frac{4}{3\sqrt{2}} = \frac{4\sqrt{2}}{6} = \frac{2\sqrt{2}}{3}$

d. $\sec(90^\circ - \theta) = 3$

b. $\cot \theta = \frac{1}{2\sqrt{6}} = \frac{\sqrt{6}}{12}$

d. $\cot(90^\circ - \theta) = 2\sqrt{6}$