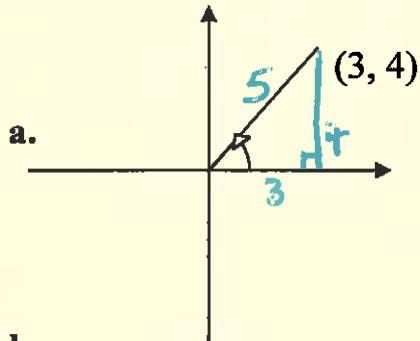
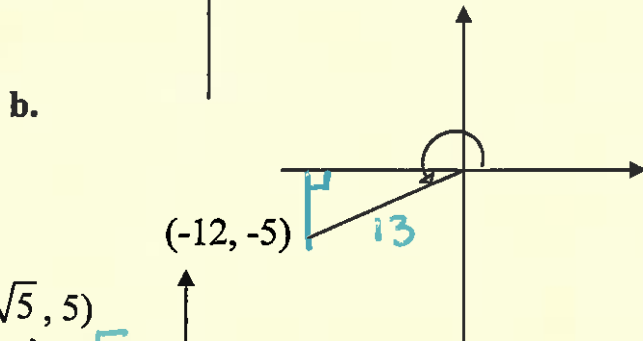


Practice 7.5: Trig Functions & Reference Angles

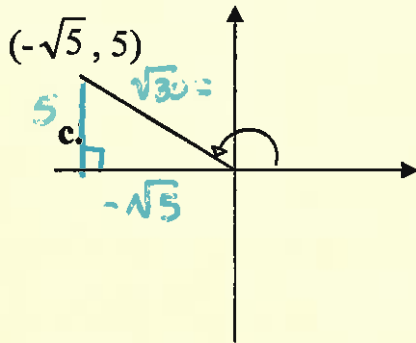
1. Find the exact value of the six trig functions of the angle θ .



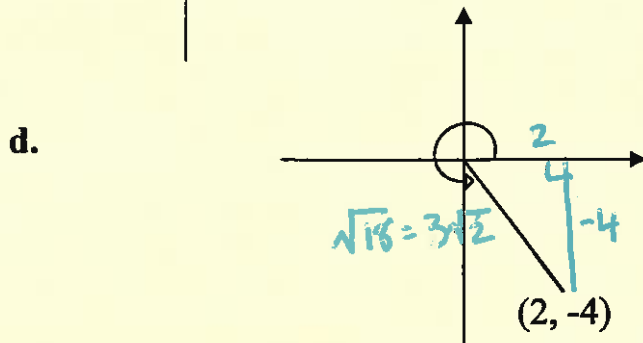
$$\begin{aligned} \sin \theta &= \frac{4}{5} & \csc \theta &= \frac{5}{4} \\ \cos \theta &= \frac{3}{5} & \sec \theta &= \frac{5}{3} \\ \tan \theta &= \frac{4}{3} & \cot \theta &= \frac{3}{4} \end{aligned}$$



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



$$\begin{aligned} \sin \theta &= \frac{5\sqrt{30}}{30} = \frac{\sqrt{30}}{6} & \csc \theta &= \frac{6}{\sqrt{30}} \\ \cos \theta &= -\frac{\sqrt{5}}{6} & \sec \theta &= -\frac{6}{\sqrt{5}} = -\frac{6\sqrt{5}}{5} \\ \tan \theta &= \frac{5}{\sqrt{5}} = \sqrt{5} & \cot \theta &= \frac{1}{\sqrt{5}} = \frac{\sqrt{5}}{5} \end{aligned}$$



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

e. Terminal pt: (7, 24)



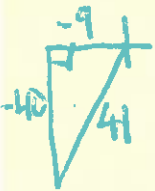
$$\begin{aligned} \sin \theta &= \frac{24}{25} & \csc \theta &= \frac{25}{24} \\ \cos \theta &= \frac{7}{25} & \sec \theta &= \frac{25}{7} \\ \tan \theta &= \frac{24}{7} & \cot \theta &= \frac{7}{24} \end{aligned}$$

f. Terminal pt: (7, -24)



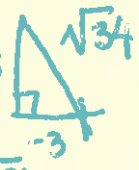
$$\begin{aligned} \sin \theta &= -\frac{24}{25} & \csc \theta &= -\frac{25}{24} \\ \cos \theta &= \frac{7}{25} & \sec \theta &= \frac{25}{7} \\ \tan \theta &= -\frac{24}{7} & \cot \theta &= -\frac{7}{24} \end{aligned}$$

g. Terminal pt: (-9, -40)



$$\begin{aligned} \sin \theta &= -\frac{40}{41} & \csc \theta &= -\frac{41}{40} \\ \cos \theta &= -\frac{9}{41} & \sec \theta &= -\frac{41}{9} \\ \tan \theta &= \frac{40}{9} & \cot \theta &= \frac{9}{40} \end{aligned}$$

h. Terminal pt: (-3, 5)



$$\begin{aligned} \sin \theta &= \frac{5\sqrt{34}}{34} & \csc \theta &= \frac{\sqrt{34}}{5} \\ \cos \theta &= -\frac{3\sqrt{34}}{34} & \sec \theta &= -\frac{\sqrt{34}}{3} \\ \tan \theta &= -\frac{5}{3} & \cot \theta &= -\frac{3}{5} \end{aligned}$$

2. Determine which quadrant θ is in.

a. $\sin \theta < 0$ & $\cos \theta < 0$ **III**

b. $\sin \theta > 0$ & $\cos \theta < 0$ **II**

c. $\sin \theta > 0$ & $\cos \theta > 0$ **I**

d. $\sin \theta < 0$ & $\cos \theta > 0$ **IV**

e. $\sin \theta > 0$ & $\tan \theta < 0$ **II**

f. $\cos \theta > 0$ & $\tan \theta < 0$ **IV**

g. $\sec \theta > 0$ & $\cot \theta < 0$ **III**

h. $\csc \theta < 0$ & $\tan \theta > 0$ **III**

$\frac{1}{\cos}$

$\frac{1}{\tan}$

$\frac{1}{\sin}$

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

4. $\sin \theta = \frac{3}{5}$

a. $\cos \theta = -\frac{4}{5}$

b. $\tan \theta = -\frac{3}{4}$

θ in QII

c. $\csc \theta = \frac{5}{3}$

d. $\sec \theta = -\frac{5}{4}$

5. $\tan \theta = -\frac{15}{8}$

a. $\cos \theta = \frac{8\sqrt{161}}{161}$

b. $\sin \theta = -\frac{15\sqrt{161}}{161}$

$\sin \theta < 0$

c. $\csc \theta = -\frac{\sqrt{161}}{15}$

d. $\sec \theta = \frac{\sqrt{161}}{8}$

3. Find and sketch the angle θ and the reference angle in standard position.

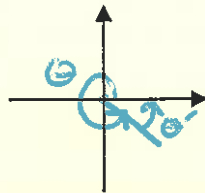
a. $\theta = 240^\circ$



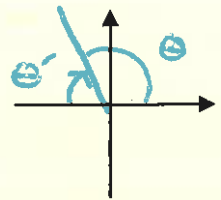
b. $\theta = 135^\circ$



c. $\theta = \frac{11\pi}{6}$



d. $\theta = \frac{2\pi}{3}$



4. Find the sin, cos and tan of each angle without a calculator.

a. $\theta = 225^\circ$ $\theta' = 45^\circ$

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

$\cos \theta = -\frac{\sqrt{2}}{2}$

$\tan \theta = +1$

b. $\theta = 120^\circ$ $\theta' = 60^\circ$

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

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

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

c. $\theta = 330^\circ$ $\theta' = 30^\circ$

$\sin \theta = -\frac{1}{2}$

$\cos \theta = +\frac{\sqrt{3}}{2}$

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

d. $\theta = 570^\circ = 360^\circ + 210^\circ$

$\sin \theta = -\frac{1}{2}$

$\cos \theta = -\frac{\sqrt{3}}{2}$

$\tan \theta = +\frac{\sqrt{3}}{2}$

e. $\theta = \frac{5\pi}{6}$ $\theta' = \frac{\pi}{6}$

$\sin \theta = +\frac{1}{2}$

$\cos \theta = -\frac{\sqrt{3}}{2}$

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

f. $\theta = \frac{7\pi}{4}$ $\theta' = \frac{\pi}{4}$

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

$\cos \theta = +\frac{\sqrt{2}}{2}$

$\tan \theta = -1$

g. $\theta = \frac{4\pi}{3}$ $\theta' = \frac{\pi}{3}$

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

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

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

h. $\theta = -\frac{\pi}{3}$ $\theta' = \frac{\pi}{3}$

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

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

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