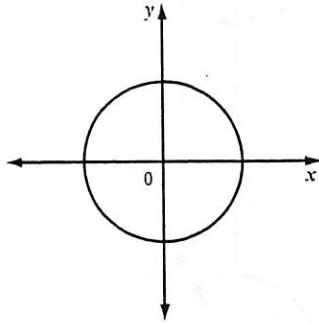


4.3 - Extra Practice

Check Your Understanding

Practise

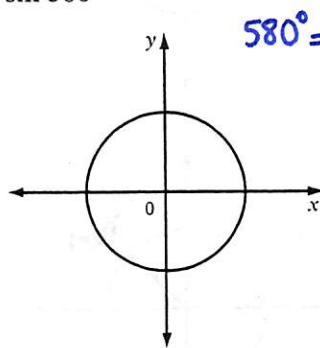
1. Point $P\left(\frac{7}{25}, -\frac{24}{25}\right)$ is on the unit circle and on the terminal arm of an angle θ in standard position. Determine the values of the six trigonometric ratios for angle θ .



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

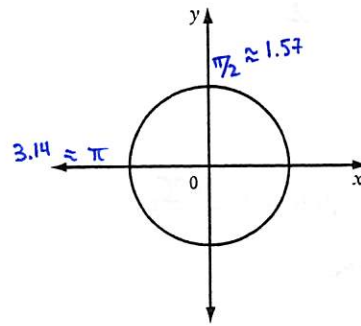
2. Without using a calculator, determine the sign (+ or -) of each of the following.

a) $\sin 580^\circ$



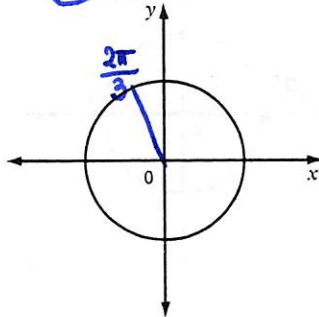
quadrant III
sign is -

b) $\tan 1$



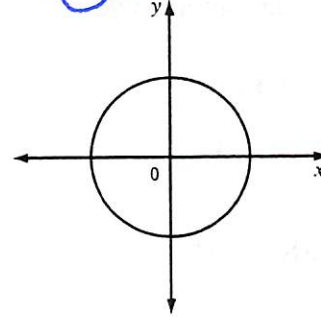
quadrant I
sign is +

c) $\csc \theta = \frac{2\pi}{3}$



quadrant II
sign is + (like $\sin \frac{2\pi}{3}$)

d) $\sec \theta = \frac{5\pi}{4}$



quadrant III
sign is - (like $\cos \frac{5\pi}{4}$)

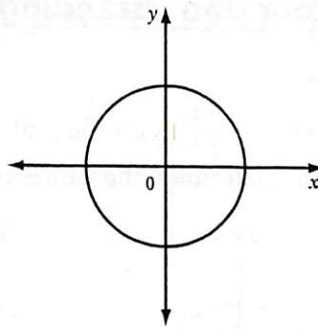
3. In which quadrant(s) is (are) the terminal arm(s) of angle θ given the following conditions?

a) $\cot \theta$ is positive I or III

b) $\cot \theta$ is positive and $\sin \theta$ is negative III

c) $\csc \theta = 1.2$ I or II

d) $\csc \theta = 1.2$ and $\cos \theta = -0.574$ II



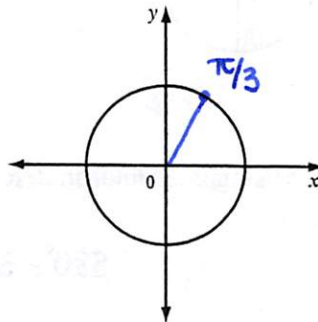
4. What is the exact value for each trigonometric ratio?

a) $\cos \frac{\pi}{3}$

$P\left(\frac{\pi}{3}\right)$ is in quadrant I.

$\theta_R = \frac{\pi}{3}$

$$\cos \frac{\pi}{3} = \frac{1}{2}$$

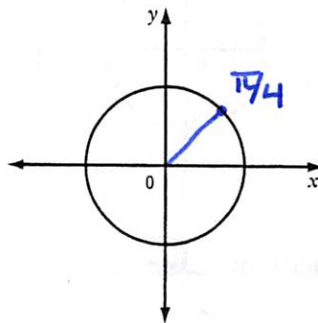


b) $\sin \frac{\pi}{4}$

$P\left(\frac{\pi}{4}\right)$ is in quadrant I.

$\theta_R = \frac{\pi}{4}$

$$\sin \frac{\pi}{4} = \frac{1}{\sqrt{2}}$$



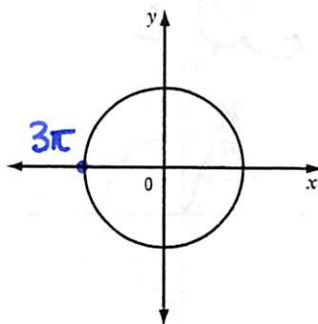
c) $\tan 3\pi$

$P(3\pi)$ is a quadrantal angle.

$$\sin 3\pi = 0$$

$$\cos 3\pi = -1$$

$$\tan 3\pi = 0$$

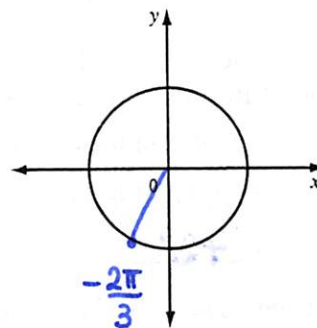


d) $\cot\left(-\frac{2\pi}{3}\right)$

$P\left(-\frac{2\pi}{3}\right)$ is in quadrant III.

$\theta_R = \frac{\pi}{3}$

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

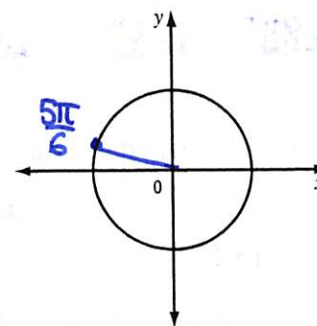


e) $\sec\frac{5\pi}{6}$

$P\left(\frac{5\pi}{6}\right)$ is in quadrant II.

$\theta_R = \frac{\pi}{6}$

$\sec\frac{5\pi}{6} = -\frac{2}{\sqrt{3}}$ or $-\frac{2\sqrt{3}}{3}$

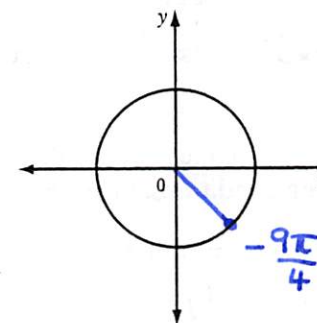


f) $\csc\left(-\frac{9\pi}{4}\right)$

$P\left(-\frac{9\pi}{4}\right)$ is in quadrant IV.

$\theta_R = \frac{\pi}{4}$

$\csc\left(-\frac{9\pi}{4}\right) = -\sqrt{2}$



5. Determine the approximate value for each trigonometric ratio, to three decimal places.

a) $\sec 74^\circ \approx 3.628$

$\sec \theta$ is the reciprocal of $\cos \theta$

quadrant: I

sign (+ or -): +

c) $\csc 2.8 \approx 2.985$

$\sin \theta$
quad II
sign +

b) $\cot 104^\circ \approx -0.249$

$\tan \theta$
quad II
sign: -

d) $\sec\left(-\frac{7\pi}{10}\right) \approx -1.701$

$\cos \theta$
quad III
sign -



These questions are similar to #1 and #2 on page 201 of *Pre-Calculus 12*.

Apply

6. Determine the measure of all angles that satisfy the following conditions. Round your answers to the nearest degree.

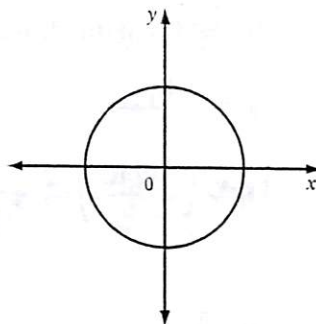
a) $\tan \theta = -3.078$ in the domain $0^\circ \leq \theta < 720^\circ$

$$\theta_R = \tan^{-1} (+3.078)$$

$$\approx \underline{72^\circ}$$

Tangent is negative in quadrants II and IV.

Therefore, $\tan \theta = -3.078$ when $\theta \approx \underline{108^\circ}$,
 288° , 468° , and 648° , $0^\circ \leq \theta < 720^\circ$.



Which other coterminal angles fall within the domain?

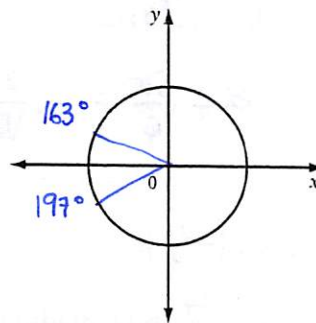
b) $\sec \theta = -1.046$ in the domain $-360^\circ \leq \theta < 360^\circ$

$\sec \theta$ is the reciprocal of $\cos \theta$.

$$\theta_R \approx \underline{17^\circ}$$

Secant is negative in quadrants II and III.

Therefore, $\sec \theta = -1.046$ when $\theta \approx \underline{-197^\circ}$,
 -163° , 163° , and 197° , $-360^\circ \leq \theta < 360^\circ$.



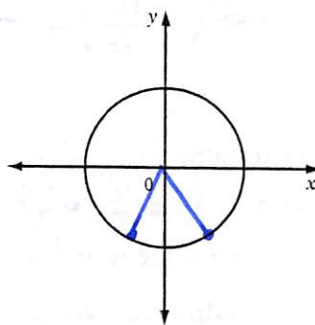
7. Determine the measure of all angles that satisfy the following conditions. Give exact answers.

a) $\sin \theta = -\frac{\sqrt{3}}{2}$ in the domain $0 \leq \theta < 4\pi$

$$\theta_R = \underline{\pi/3}$$

Sine is negative in quadrants III and IV.

Therefore, $\sin \theta = -\frac{\sqrt{3}}{2}$ when $\theta = \underline{4\pi/3}$, $5\pi/3$,
 $10\pi/3$, and $11\pi/3$, $0 \leq \theta < 4\pi$.



Drawing the special triangle may help.

b) $\csc \theta = 2$ in the domain $-2\pi \leq \theta < 2\pi$

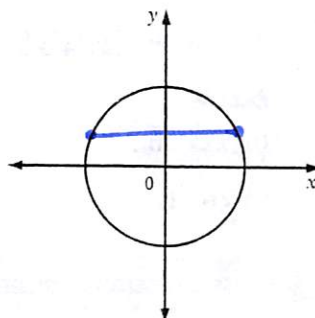
$\csc \theta$ is the reciprocal of $\sin \theta$.

$$\theta_R = \underline{\pi/6}$$

Cosecant is positive in quadrants I and II.

Therefore, $\csc \theta = 2$ when $\theta = \underline{-11\pi/6}$, $-7\pi/6$,
 $\pi/6$, and $5\pi/6$, $-2\pi \leq \theta < 2\pi$.

What is the reciprocal of 2?

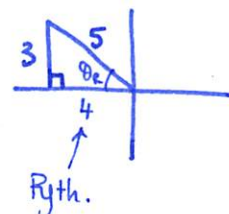


$$\sin \theta = \frac{3}{5}$$

8. Determine the value of the five other trigonometric ratios if $\csc \theta = \frac{5}{3}$, $90^\circ \leq \theta < 180^\circ$.

The angle is in quadrant II.

$x =$ _____ $y =$ _____ $r =$ _____
 $\sin \theta = \underline{\frac{3}{5}}$ $\cos \theta = \underline{-\frac{4}{5}}$ $\tan \theta = \underline{-\frac{3}{4}}$
 $\sec \theta = \underline{-\frac{5}{4}}$ $\cot \theta = \underline{-\frac{4}{3}}$



This question will help you with #12 on page 202 of *Pre-Calculus 12*.

Connect

9. Choose any two of the special angles $\frac{\pi}{6}$, $\frac{\pi}{4}$, and $\frac{\pi}{3}$. Complete the table below. You may also choose the quadrantal angles (on the axes), but then you will have to change the headings on the table.

$\theta_R =$	Quadrant I	Quadrant II	Quadrant III	Quadrant IV
	sin			
	csc			
	cos			
	sec			
	tan			
	cot			
$\theta_R =$	Quadrant I	Quadrant II	Quadrant III	Quadrant IV
	sin			
	csc			
	cos			
	sec			
	tan			
	cot			