MATH 30 - Precalculus. Homework 8. Due 04/10/2024. Professor Luis Fernández

SOLUTION

DO NOT write your answers here, except the graphs. Do it in other sheets and **show all your work**.
STAPLE this sheet to your other sheets.

1. Given that $\cos\alpha = -\frac{2}{5}$, and that α is in Quadrant II, find the exact value of $\sin\alpha$, $\tan\alpha$, $\sec\alpha$, $\csc\alpha$, $\cot\alpha$.

Solution: $\sin\alpha = \frac{\sqrt{21}}{5}$, $\tan\alpha = -\frac{\sqrt{21}}{2}$, $\cot\alpha = -\frac{2}{\sqrt{21}}$, $\sec\alpha = -\frac{5}{2}$, $\csc\alpha = \frac{5}{\sqrt{21}}$.

2. Given that $\tan\alpha = -\frac{2}{5}$, and that α is in Quadrant IV, find the exact value of $\sin\alpha$, $\cos\alpha$, $\sec\alpha$, $\csc\alpha$, $\cot\alpha$.

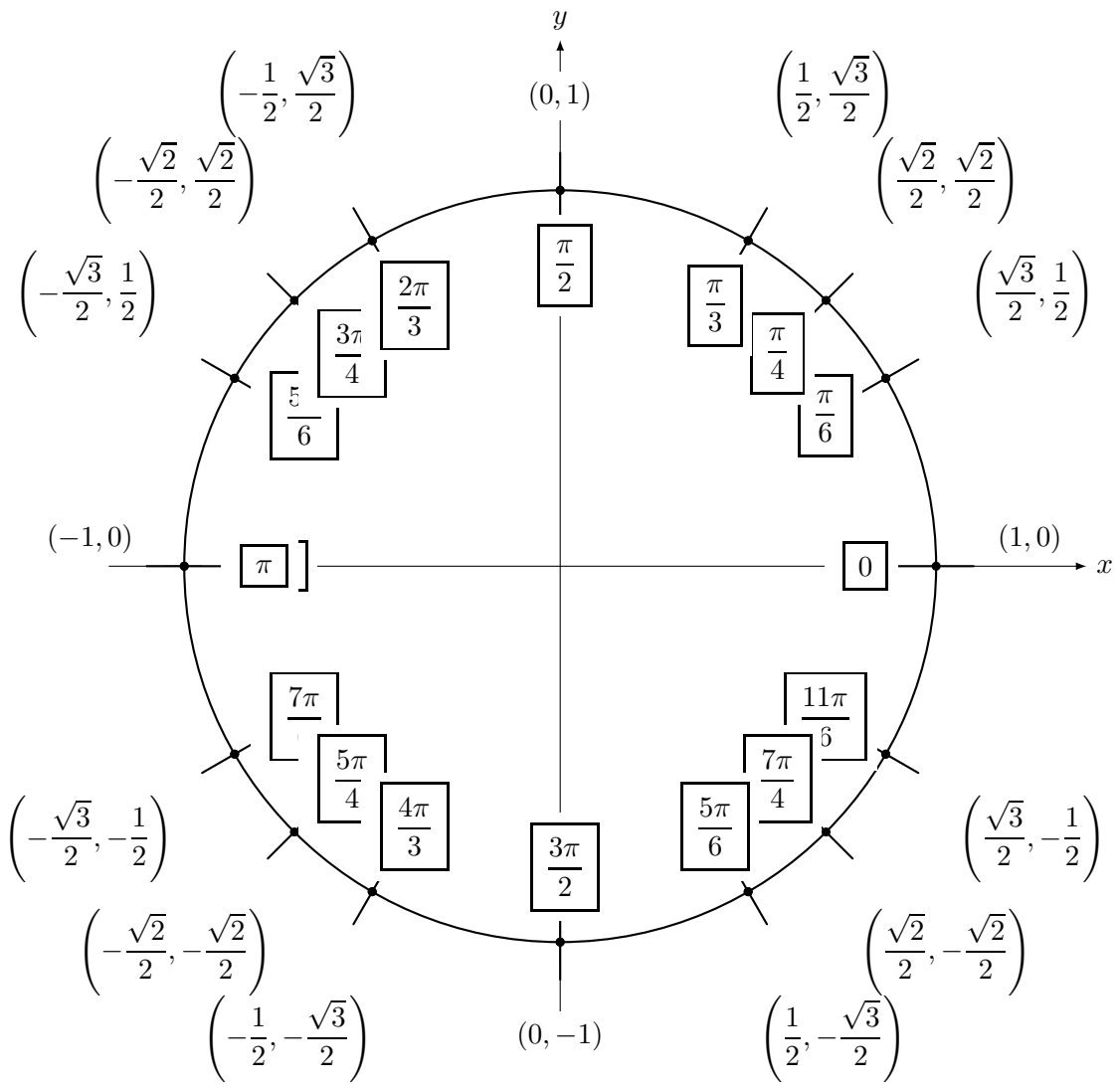
Solution: $\sin\alpha = -\frac{2}{\sqrt{29}}$, $\cos\alpha = \frac{5}{\sqrt{29}}$, $\cot\alpha = -\frac{5}{2}$, $\sec\alpha = \frac{\sqrt{29}}{5}$, $\csc\alpha = -\frac{2}{\sqrt{29}}$.

3. Given that $\sin\alpha = \frac{2}{3}$, and that α is in Quadrant II, find the exact value of $\cos\alpha$, $\tan\alpha$, $\sec\alpha$, $\csc\alpha$, $\cot\alpha$.

Solution: $\cos\alpha = -\frac{\sqrt{5}}{3}$, $\tan\alpha = -\frac{2}{\sqrt{5}}$, $\cot\alpha = -\frac{\sqrt{5}}{2}$, $\sec\alpha = -\frac{3}{\sqrt{5}}$. $\csc\alpha = \frac{3}{2}$,

4. Fill in the angles, **in radians**, inside the boxes. Then fill in the coordinates of the points marked in the circle. And remember that the sine of an angle is the y coordinate, and the cosine is the x coordinate.

Solution:



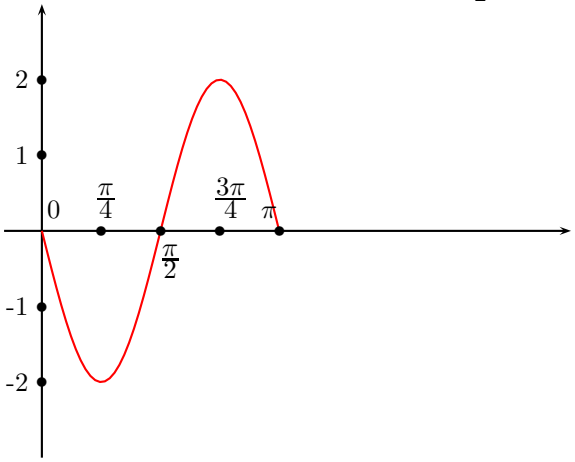
5. Complete the following table.

x in deg	x in rad	$\sin x$	$\cos x$	$\tan x$	$\sec x$	$\csc x$	$\cot x$
$0°$	0	0	1	0	1	Undef.	Undef.
$30°$	$\frac{\pi}{6}$	$\frac{1}{2}$	$\frac{\sqrt{3}}{2}$	$\frac{1}{\sqrt{3}}$	$\frac{2}{\sqrt{3}}$	2	$\sqrt{3}$
$45°$	$\frac{\pi}{4}$	$\frac{\sqrt{2}}{2}$	$\frac{\sqrt{2}}{2}$	1	$\sqrt{2}$	$\sqrt{2}$	1
$60°$	$\frac{\pi}{3}$	$\frac{\sqrt{3}}{2}$	$\frac{1}{2}$	$\sqrt{3}$	2	$\frac{2}{\sqrt{3}}$	$\frac{1}{\sqrt{3}}$
$90°$	$\frac{\pi}{2}$	1	0	Undef.	Undef.	1	0
$120°$	$\frac{2\pi}{3}$	$\frac{\sqrt{3}}{2}$	$-\frac{1}{2}$	$-\sqrt{3}$	-2	$\frac{2}{\sqrt{3}}$	$-\frac{1}{\sqrt{3}}$
$135°$	$\frac{3\pi}{4}$	$\frac{\sqrt{2}}{2}$	$-\frac{\sqrt{2}}{2}$	-1	$-\sqrt{2}$	$\sqrt{2}$	-1
$150°$	$\frac{5\pi}{6}$	$\frac{1}{2}$	$-\frac{\sqrt{3}}{2}$	$-\frac{1}{\sqrt{3}}$	$-\frac{2}{\sqrt{3}}$	2	$-\sqrt{3}$
$180°$	π	0	-1	0	-1	Undef.	Undef.
$210°$	$\frac{7\pi}{6}$	$-\frac{1}{2}$	$-\frac{\sqrt{3}}{2}$	$\frac{1}{\sqrt{3}}$	$-\frac{2}{\sqrt{3}}$	-2	$\sqrt{3}$
$225°$	$\frac{5\pi}{4}$	$-\frac{\sqrt{2}}{2}$	$-\frac{\sqrt{2}}{2}$	1	$-\sqrt{2}$	$-\sqrt{2}$	1
$240°$	$\frac{4\pi}{3}$	$-\frac{\sqrt{3}}{2}$	$-\frac{1}{2}$	$\sqrt{3}$	-2	$-\frac{2}{\sqrt{3}}$	$\frac{1}{\sqrt{3}}$
$270°$	$\frac{3\pi}{2}$	-1	0	Undef.	Undef.	-1	0
$300°$	$\frac{5\pi}{3}$	$-\frac{\sqrt{3}}{2}$	$\frac{1}{2}$	$-\sqrt{3}$	2	$-\frac{2}{\sqrt{3}}$	$-\frac{1}{\sqrt{3}}$
$315°$	$\frac{7\pi}{4}$	$-\frac{\sqrt{2}}{2}$	$\frac{\sqrt{2}}{2}$	-1	$\sqrt{2}$	$-\sqrt{2}$	-1
$330°$	$\frac{11\pi}{6}$	$-\frac{1}{2}$	$\frac{\sqrt{3}}{2}$	$-\frac{1}{\sqrt{3}}$	$\frac{2}{\sqrt{3}}$	-2	$-\sqrt{3}$
$360°$	2π	0	1	0	1	Undef.	Undef.

6. For the following sinusoidal functions, find the amplitude, the period, and the phase shift. Then sketch one period of the graph in the axes provided. You can do the graph using a computer, but sketch it here by hand and make sure to mark and label exactly (using fractions of π) the phase shift, the intercepts, and the points where the graph is at the top and at the bottom.

a) $f(x) = 2\sin(2x - \pi)$

Solution: Amplitude 2, period π, phase shift $\frac{\pi}{2}$.



b) $g(x) = \sin(3x - \frac{\pi}{2})$

Solution: Amplitude 2, period π, phase shift $\frac{\pi}{2}$.