Homework: 353#1, 2, 3, 5, *6, 7ab

The Graphs of Reciprocal Trigonometric Functions

Recall: The Graphs of Reciprocal Functions --> $f(x) = \dfrac{1}{g(x)}$

- points where y = 1 or y = -1 on the parent function coincide as points on the reciprocal function.
- x-intercepts on the parent function are vertical asymptotes on the reciprocal function.
- positive and negative intervals remain the same for both the parent and reciprocal function.
- increasing and decreasing intervals for the parent function are opposite for the reciprocal.

The Reciprocal Trigonometry Functions

$\csc\theta = \dfrac{1}{\sin\theta}$ $\qquad$ $\sec\theta = \dfrac{1}{\cos\theta}$ $\qquad$ $\cot\theta = \dfrac{1}{\tan\theta}$

Activity

1. Complete the following table of values (2 decimal places), graph the function, and fill in the blanks.

θ	$-\frac{\pi}{2}$	$-\frac{\pi}{3}$	$-\frac{\pi}{6}$	0	$\frac{\pi}{6}$	$\frac{\pi}{3}$	$\frac{\pi}{2}$	$\frac{2\pi}{3}$	$\frac{5\pi}{6}$	π	$\frac{7\pi}{6}$	$\frac{4\pi}{3}$	$\frac{3\pi}{2}$	$\frac{5\pi}{3}$	$\frac{11\pi}{6}$	2π
$y = \csc\theta$	-1	-1.15	-2	Und.	2	1.15	1	1.15	2	Und	-2	-1.15	-1	-1.15	-2	Und.

Domain: $\{\theta \in \mathbb{R} \mid \theta \neq n\pi, n \in I\}$

Range: $\{y \in \mathbb{R} \mid |y| \geq 1\}$

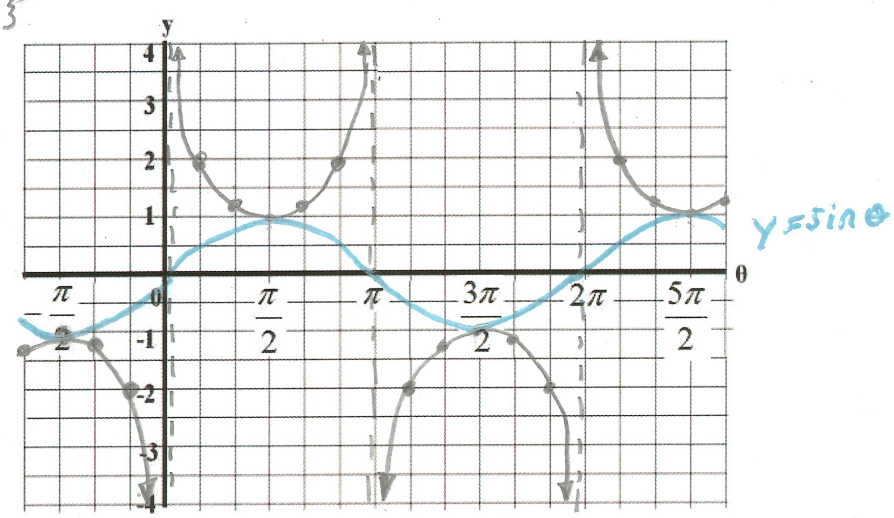
Maximum: None

Minimum: None

V. Asymptotes: $\theta = n\pi, n \in I$

θ-intercepts: None

Period: 2π



2. Complete the following table of values (2 decimal places), graph the function, and fill in the blanks.

θ	$-\frac{\pi}{2}$	$-\frac{\pi}{3}$	$-\frac{\pi}{6}$	0	$\frac{\pi}{6}$	$\frac{\pi}{3}$	$\frac{\pi}{2}$	$\frac{2\pi}{3}$	$\frac{5\pi}{6}$	π	$\frac{7\pi}{6}$	$\frac{4\pi}{3}$	$\frac{3\pi}{2}$	$\frac{5\pi}{3}$	$\frac{11\pi}{6}$	2π
$y=\sec\theta$	Und.	2	1.15	1	1.15	2	Und	-2	-1.15	-1	-1.15	-2	Und.	2	1.15	1

Domain: $\{\theta \in \mathbb{R} \mid \theta \neq \frac{\pi}{2} + n\pi, n \in I\}$

Range: $\{y \in \mathbb{R} \mid |y| \geq 1\}$

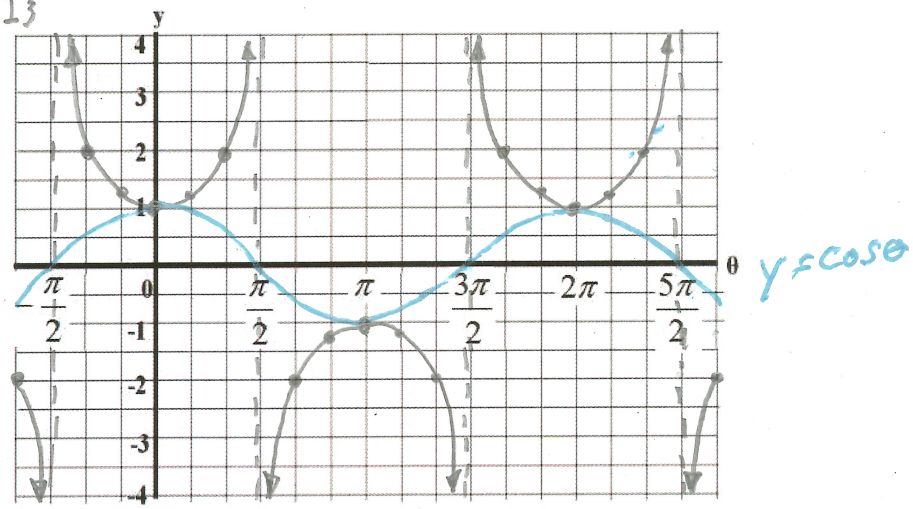
Maximum: None

Minimum: None

V. Asymptotes: $\theta = \frac{\pi}{2} + n\pi, n \in I$

θ-Intercepts: None

Period: 2π



3. Complete the following table of values (2 decimal places), graph the function, and fill in the blanks.
Hint: Use the table of values for $y=\cos\theta$ and $y=\sin\theta$ to determine some of these entries.

θ	$-\frac{\pi}{2}$	$-\frac{\pi}{3}$	$-\frac{\pi}{6}$	0	$\frac{\pi}{6}$	$\frac{\pi}{3}$	$\frac{\pi}{2}$	$\frac{2\pi}{3}$	$\frac{5\pi}{6}$	π	$\frac{7\pi}{6}$	$\frac{4\pi}{3}$	$\frac{3\pi}{2}$	$\frac{5\pi}{3}$	$\frac{11\pi}{6}$	2π
$y=\cot\theta=\boxed{\frac{\cos\theta}{\sin\theta}}$	0	-0.58	-1.73	Und.	1.73	0.58	0	-0.58	-1.73	Und.	1.73	0.58	0	-0.58	-1.73	Und.

Domain: $\{\theta \in \mathbb{R} \mid \theta \neq n\pi, n \in I\}$

Range: $\{y \in \mathbb{R}\}$

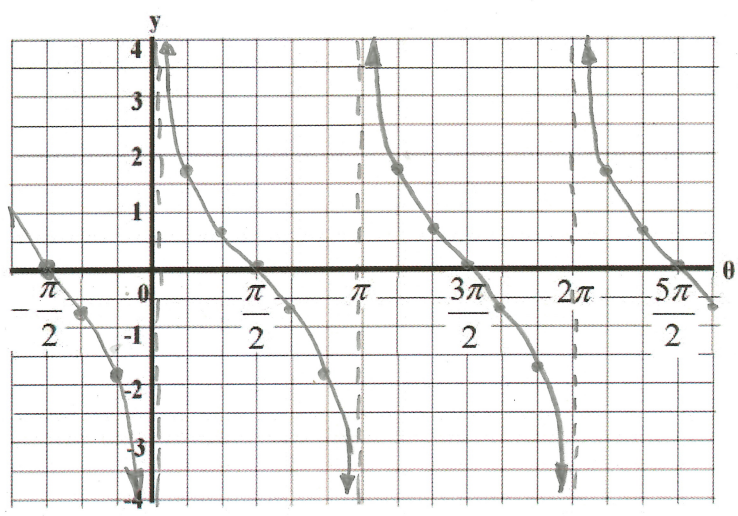
Maximum: None

Minimum: None

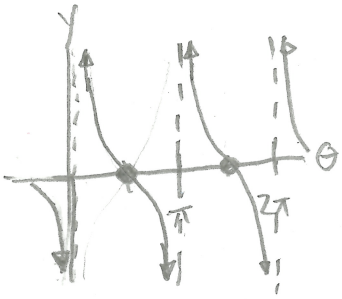
V. Asymptotes: $\theta = n\pi, n \in I$

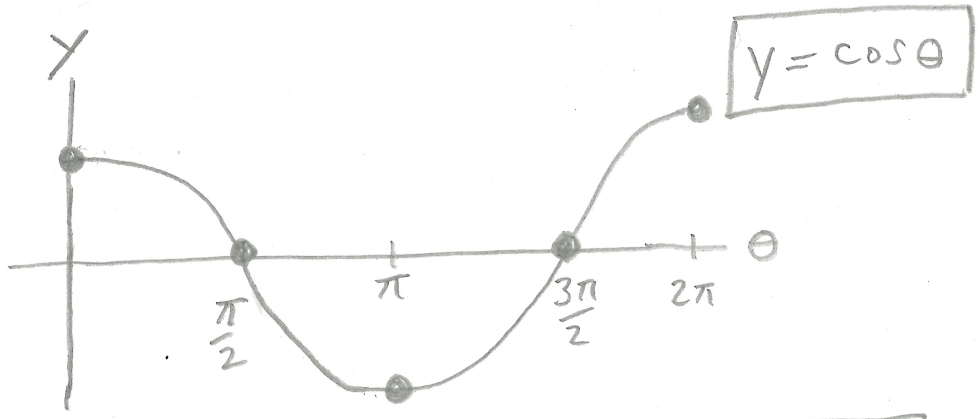
θ - intercepts: $\frac{\pi}{2} + n\pi, n \in I$

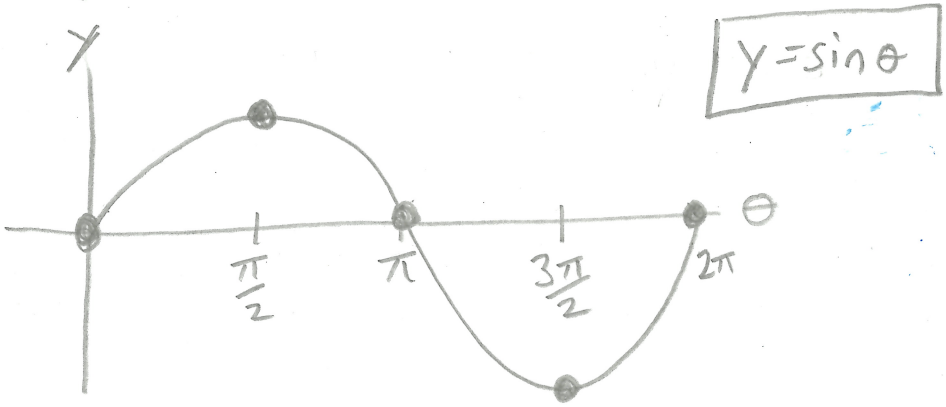
Period: π



$y = \cot\theta = \frac{\cos\theta}{\sin\theta}$







$|y| \geq 1$