5.3: Properties of the Trig. Functions

Domain and Range of Trig. Functions

Function	Domain	Range
y=sinx		
y=cos		
y=tanx		
y=cotx		
y=cscx		
y=secx		

Graphs of the Trig functions (will be done in lecture)

Period of Trig Functions:

Def: **A function is periodic if there is a positive number p such that whenever θ is in the domain of f, so is $\theta + p$, and**

$$f(\theta + p) = f(\theta)$$

If there is a smallest number p, this smallest value called period of f

$\sin(\theta + 2\pi k) =$
$\cos(\theta + 2\pi k) =$
$\tan(\theta + \pi k) =$

Where k is an integer

Ex: Find the exact values for

1) $\sin 480^{o}$ **2)** $\sec(-\frac{17\pi}{4})$

Ex: Find the quadrant containing the terminal side of the angle:

1) $\frac{19\pi}{3}$ **2)** $-\frac{21\pi}{4}$ **3)** $-\frac{35\pi}{6}$

Ex: **Signs of the Trig. Functions**

1) If $\sin\theta < 0$ *and* $\cos\theta > 0 \Rightarrow \theta$ *is in quadrant* $---?$

2) If $\sin\theta > 0$ *and* $\tan\theta < 0 \Rightarrow \theta$ *is in quadrant* $---?$

Fundamental Identities:

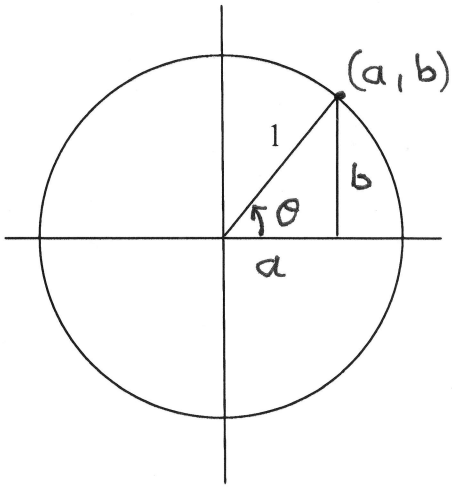
I)

$\sin\theta =$

$\cos\theta =$

$\tan\theta =$

$\cot\theta =$



II) $\sin\theta = b$, $\cos\theta = a$

$a^2 + b^2 = 1$

Then:

1)

2)

3)

Ex: **Find the exact values for the remaining Trig. Functions.**

1) Given $\sin\theta = -\frac{5}{13}$ **, and** θ **is in Quad. III**

2) Given $\tan\theta = -\frac{1}{3}$ **, and** $\sin\theta > 0$

Ex: **Evaluate the following expressions using Trig. Identities, assuming that** $0 < \theta < \frac{\pi}{2}$

1) **If** $x = \frac{1}{2}\cos\theta$ **, Find** $\frac{x}{\sqrt{1-4x^2}}$

2) **If** $x = \frac{3}{2}\sec\theta$ **, Find** $\frac{\sqrt{4x^2-9}}{x}$

Ex:

1) If $\sin\theta = -\frac{1}{2}$, $-2\pi < \theta < -\frac{\pi}{2}$, find θ

2) If $\tan\theta = -1$, $-2\pi < \theta < -\pi$, find θ

3) If $\csc\theta$ is undefined , $-\frac{3\pi}{2} < \theta \leq 0$, find θ

Ex: Evaluate

$$\sin(-\frac{5\pi}{2}) + \sec(-3\pi) - \cot(\frac{9\pi}{2})$$

NOTE: Useful right triangles