

Lesson #19

Aim: How do we sketch the graph of $y = \csc \theta$, $y = \sec \theta$ and $y = \cot x$?

Do Now: If $\cos \theta = -\frac{3}{4}$ and θ is QIII find $\tan \theta$, $\sin \theta$.

$\cos \theta = -\frac{3}{4} = \frac{\text{adj}}{\text{hyp}} = -\frac{3}{4}$ (x)

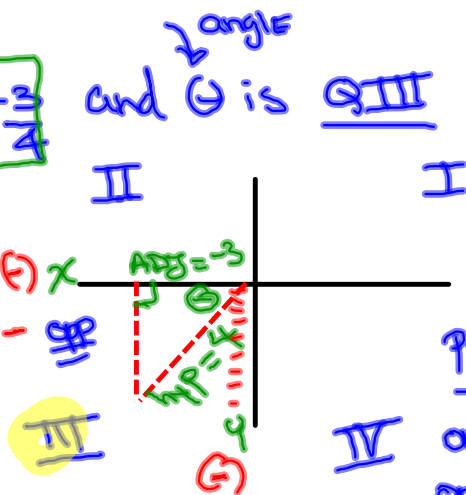
$\tan \theta = \frac{\text{opp}}{\text{adj}} = \frac{-\sqrt{7}}{-3} = \frac{\sqrt{7}}{3}$

$\sin \theta = \frac{\text{opp}}{\text{hyp}} = \frac{-\sqrt{7}}{4}$

$\cot \theta = \frac{3}{\sqrt{7}} \cdot \frac{\sqrt{7}}{\sqrt{7}} = \frac{3\sqrt{7}}{7}$

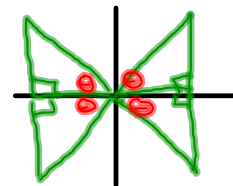
$\csc \theta = -\frac{4}{\sqrt{7}} \cdot \frac{\sqrt{7}}{\sqrt{7}} = -\frac{4\sqrt{7}}{7}$

$\sec \theta = -\frac{4}{3}$



Pyth th.
 $\text{opp}^2 + (-3)^2 = 4^2$
 $\text{opp}^2 = 16 - 9$
 $\text{opp}^2 = 7$
 $\text{opp} = \sqrt{7}$

Reference



I- Other trigonometric functions

$$1) \sin \theta = \frac{\text{OPP}}{\text{HYP}}$$

$$2) \cos \theta = \frac{\text{ADJ}}{\text{HYP}}$$

$$3) \tan \theta = \frac{\text{OPP}}{\text{ADJ}} = \frac{\sin \theta}{\cos \theta} = \frac{\frac{\text{OPP}}{\text{HYP}}}{\frac{\text{ADJ}}{\text{HYP}}} = \frac{\text{OPP}}{\text{ADJ}}$$

$$4) \text{cotangent} = \cot \theta = \frac{1}{\tan \theta} = \frac{\cos \theta}{\sin \theta} = \frac{\text{ADJ}}{\text{OPP}}$$

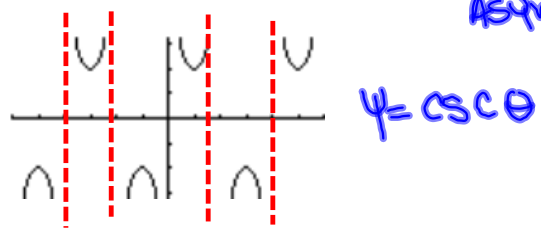
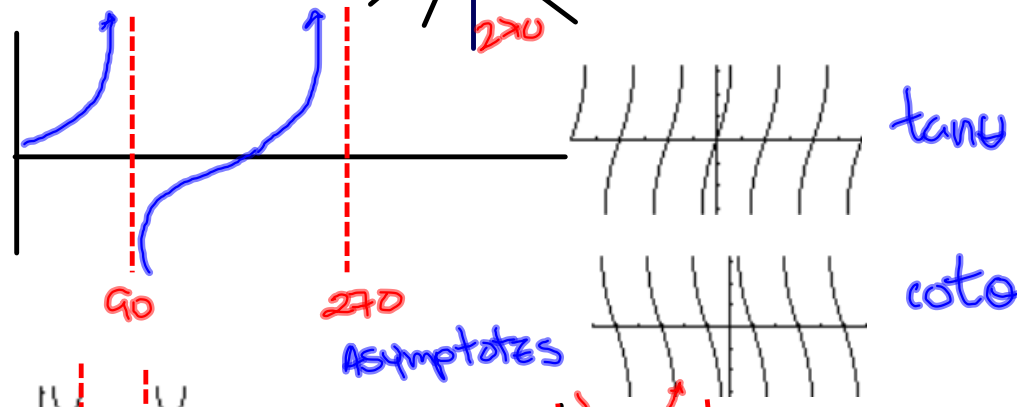
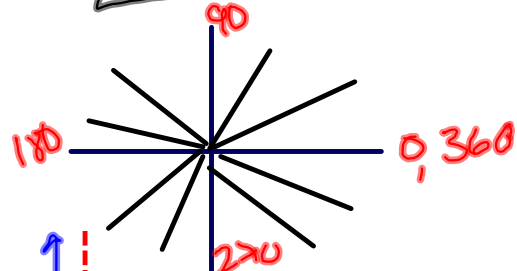
$$5) \text{cosecant} = \csc \theta = \frac{1}{\sin \theta} = \frac{\text{HYP}}{\text{OPP}}$$

$$6) \text{Secant} = \sec \theta = \frac{1}{\cos \theta} = \frac{\text{HYP}}{\text{ADJ}}$$

II- Graphs of $\tan\theta$, $\cot\theta$, $\csc\theta$, $\sec\theta$

1) use a table

	0	90	180	270	360
$\tan\theta$	$\frac{\sin 0}{\cos 0} = \frac{0}{1}$	$\frac{\sin 90}{\cos 90} = \frac{1}{0}$	$\frac{\sin 180}{\cos 180} = \frac{0}{-1}$	$\frac{\sin 270}{\cos 270} = \frac{-1}{0}$	0
	0	Error	0	Error	0



Asymptotes

$y = \csc\theta$