1.4. Using the Definitions of Trig Functions Thursday, January 24,0019 8:01 AM

Reciprocal Identities.

$$A = \frac{1}{A = \theta}$$
; $A = \frac{1}{A = \theta}$; $A = \frac{1}{A = \theta}$

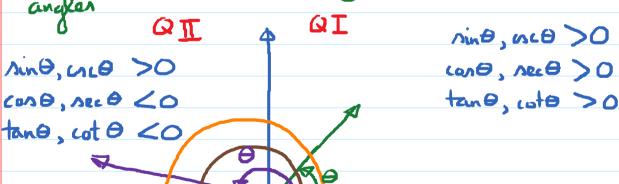
$$\cos \theta = \frac{1}{\sin \theta}$$
; $\sec \theta = \frac{1}{\cos \theta}$
; $\cot \theta = \frac{1}{\tan \theta}$

$$tan\theta = -\frac{1}{4}$$

E.g.
$$LON\Theta = -\frac{2}{\sqrt{20}}$$
. Find $Nec\Theta$.

$$Sec\theta = \frac{\sqrt{20}}{2} = \frac{2\sqrt{5}}{7} = -\sqrt{5}$$

Determine the signs of trig functions of non quadrantal angles



sine, use <0 cose, see >0 tene, cote <0

sinθ, cscθ ∠0 cosθ, secθ ∠0 tenθ, cotθ >0 β

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QIII

E.g. cos 0 <0, sin 0 <0

_ 6 is in Q III.

E.g. $cos\theta > 0$, $sec\theta > 0$

_ O is in QI on QIV

E.g. coto <0, reco <0.

_ D is in QII.

E.g. -115° $sin(-115^{\circ}) < 0$; $con(-115^{\circ}) < 0$,

tan (-115°) >0

E.g. 855° → Q∏

sin (855°) >0, cos (855°)<0, tan (855°)<0

Pythagorean Identities.

 $\sin^2\theta + \cos^2\theta = 1$

 $\sin^2\theta = 1 - \cos^2\theta$

4 con 0 = 1 - sin 2 0

$$(x^2\theta - \omega^2\theta - 1)$$

$$\omega t^2 \theta + 1 = \omega c^2 \theta$$

Quotient Identitien:

$$tcm\theta = \frac{sin\theta}{cos\theta}$$
; $cot\theta = \frac{cos\theta}{sin\theta}$

$$tan\theta = \frac{4/R}{x/R} = \frac{sin\theta}{cos\theta}$$

E.g. Given: cos
$$\theta = \frac{4}{5}$$
 and θ is in $Q \overline{Q}$

Find sind.

$$nin^{2}\theta = 1 - \omega n^{2}\theta = 1 - \left(\frac{4}{5}\right)^{2} = \frac{1.25}{1.26} \frac{16}{25}$$

$$= \frac{25 - 16}{25} = \frac{9}{25}$$

$$\int \sin^2\theta = \frac{9}{25} \qquad \int \sin\theta = \pm \frac{3}{5}$$

Since 0 is in QIV, sin & < 0.

Hence,
$$\sin \theta = -\frac{3}{5}$$
.

E.g. Given
$$\sin\theta = \frac{1}{2}$$
 and θ is in QII.

Find tano.

$$cnc\theta = \frac{1}{sin\theta} = 2$$

$$\cot^2\theta = \cot^2\theta - 1 = 4 - 1 = 3$$

$$tan\theta = \frac{1}{\cot \theta} = \frac{1}{-\sqrt{3}} = \frac{1}{\sqrt{3}} = \frac{1}{\sqrt{3}}$$

$$E.g.$$
 $con\theta = -\frac{\sqrt{3}}{2}$, θ is in $QIII$

Find the values of the nest of the trig functions of O.

$$\sin^2\theta = 1 - \cos^2\theta = 1 - \left(-\frac{13}{2}\right)^2 = 1 - \frac{3}{4}$$

$$\sin^2\theta = \frac{1}{4}$$
 \Rightarrow $\sin\theta = \frac{1}{2}$

$$\theta$$
 in $Q III , So, sin $\theta = -\frac{1}{2}$$

$$tan\theta = \frac{\Delta in\theta}{\omega \Delta \theta} = \frac{1}{2} = \frac{1}{2} \cdot \frac{2}{\sqrt{3}} = \frac{2}{2\sqrt{3}}$$

$$tan\theta = \frac{1}{2} \cdot \frac{13}{2} = \frac{1}{2} \cdot \frac{2}{\sqrt{3}} = \frac{2}{2\sqrt{3}}$$

$$tan\theta = \frac{\sqrt{3}}{3}$$
 $cot\theta = \frac{3}{\sqrt{3}} = \sqrt{3}$

$$\Delta RC\theta = -\frac{2}{\sqrt{3}} \cdot \frac{\sqrt{3}}{\sqrt{3}} = -\frac{2\sqrt{3}}{3}$$

The Range Valuer of Trig Functions.

Function	Range
منه, دمه	$\begin{bmatrix} -1,1 \end{bmatrix}$ $-1 \leq \sin\theta, \cos\theta \leq 1$
CALO, MECO	(-∞,-1]∪[1,∞)
tano, coto	(-00,00)