1.4. Using the Definition of the trig functions

Obj. 1: Reciprocal Identities.

$$Sim \theta = \frac{y}{R}$$
 $coc\theta = \frac{R}{y}$ $tan \theta = \frac{y}{x}$
 $cos\theta = \frac{x}{R}$ $sec\theta = \frac{R}{x}$ $cot\theta = \frac{x}{y}$.

$$\frac{1}{R}$$
 $SC\theta = \frac{K}{3}$

$$n\theta = \frac{x}{R}$$
 $nec\theta = \frac{R}{x}$

Reciprocal Identities.

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

$$CAC\theta = \frac{1}{\sin \theta}$$

$$con\theta = \frac{1}{n}$$

$$Aec\theta = \frac{1}{con\theta}$$

$$tan\theta = \frac{1}{\cot \theta}$$

$$\cot \theta = \frac{1}{\tan \theta}$$

E.g.
$$\Lambda e c \theta = \frac{11}{6}$$
. Find $cos\theta = \frac{6}{11}$

$$E_{g}. \quad CSC\theta = -\frac{\sqrt{20}}{2}$$

Find
$$\sin \theta$$
? $\sin \theta = -\frac{2}{\sqrt{20}} \cdot \frac{\sqrt{20}}{\sqrt{20}}$

$$\sin\theta = -\frac{2\sqrt{5}}{10} = -\frac{\sqrt{5}}{5}$$

Obj 2: Signs of trig function values I β in $\theta > 0$ sin0>0 (000<0 II $con\theta > 0$ DELO COR crib >0; reco>0 tand >0; cotd >0 tan0 < 0 640 CO. siny <0 CONY <0 secy 40 sing <0 (nc | 6 < 0 W(Y < 0 tany >0; coty >0 601B >0 Nec B >0 6t 12 < 0 tan B < 0 Eg@ 0 = 13° Find the signs of sino, coso, etc. All the right of trig franctions values of a are pointire because & is in the first

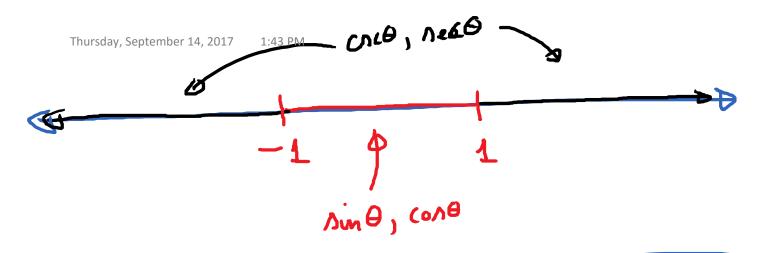
quathrant

(b) $\theta = 373^{\circ}$ Signs: all possitive Jun(307°) < 0; con(307°) > 0...Nun (-170°) <0 → con(-170°) <0 (d) - 170° TIL & -170°

E.g. a b is an angle such that sind > 0 and tand < 0.
Which quadrant door Θ bolong to? (b) O is an angle such that coso < 0 and

O could be un quadrant I or III.

		-
Range of Trig function values. Function Range Interval Motation		
Function	Range	Interval Motation
	$-1 \leq \sin\theta \leq 1$	[-1, 1]
	$-1 \leq \cos \leq 1$	[-1, 1]
Deco, ULO	Eithen usco > 1	(-00, -1] U[1,00)
	on usc∂ ≤ -1 Either sec∂ ≥ 1	
	on her $\theta \leq -L$	
tano, coto	Any real #	(-∞,∞)
E.g. (a) $\sin \theta = -2.785$ Impossible (b) $\csc \theta = -0.8916$ Impossible.		
(b) $csc\theta = -0.8916$ — Impossible.		



E.g. Suppose Θ is an angle in quadrant Π and $\sin\theta = \frac{2}{3}$.

Q: Find the values of the other 5 trigger functions of Θ Reg. Suppose Θ is an angle in quadrant Π

 $CSC\theta = \frac{3}{2}$. Since $Sin\theta = \frac{2}{3}$, we can choose a point on the terminal ride of the

the angle with y=2 and R=3 Thursday, September 14, 2017 y=2; R=3 $R = \sqrt{x^2 + y^2}$ $3 = \sqrt{x^2 + 4}$ Since Dis in quadrant II, $9 = x^2 + 4$ $x^2 = 5$; $x = \pm \sqrt{5}$ $\chi = -\sqrt{5}.$ We got $x = -\sqrt{5}$; y = 2; R = 3. -> we can find everything. E.g. Θ is an angle in quadrant 4 $\cos \theta = \frac{1}{2}$. Find the values of the remaining trig funtions



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