

2.2 Trig Ratios of Any Angle

Read the 5 skills at the top of pg. 88.

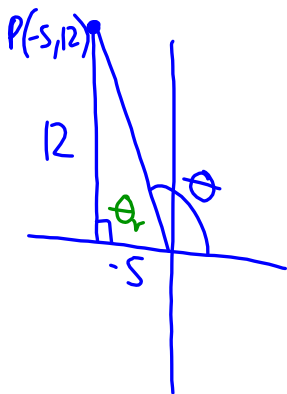
Do the Investigation (pg. 88-89) #1-8.

$$\sin\theta = \frac{y}{r} \quad \cos\theta = \frac{x}{r} \quad \tan\theta = \frac{y}{x} \quad (r > 0 \text{ always})$$

$\sin\theta > 0$ in QI & II $\cos\theta > 0$ in QI & IV $\tan\theta > 0$ in QI & III

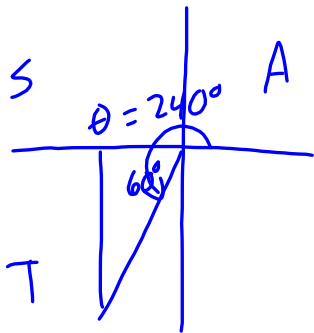
S		A
II	I	
III	IV	
T		C

ex) $P(-5, 12)$ is on the terminal arm of an angle θ , in S.P. Determine the 3 trig ratios for θ .



$$\begin{aligned} \cos \theta &= -5/13 & \theta &= 113^\circ & r^2 &= x^2 + y^2 \\ & & & & &= (-5)^2 + (12)^2 \\ \sin \theta &= 12/13 & \theta &= 67^\circ & &= 169 \\ \tan \theta &= -12/5 & \theta &= -67^\circ & r &= \pm 13 \rightarrow +13 \end{aligned}$$

ex) Find the exact value of $\cos 240^\circ$.



Think about $\cos 60^\circ$ (60° is the θ_r for 240°)

$$\cos 60^\circ = \frac{1}{2}$$

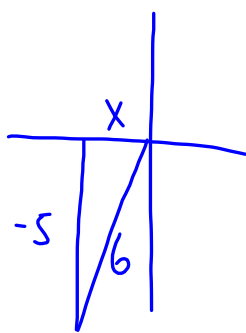
Since θ is in Q_{III} ,

$\cos \theta$ is negative.

$$\cos 240^\circ = -\frac{1}{2}$$

ex) θ is an angle in SP with terminal arm in Q III. ($180^\circ \leq \theta \leq 270^\circ$) $\sin \theta = -\frac{5}{6}$

Determine $\cos \theta$ & $\tan \theta$ exactly.



$$x^2 = 6^2 - (-5)^2$$

$$x^2 = 11$$

$$x = \pm \sqrt{11}$$

$$x = -\sqrt{11} \text{ since Q III.}$$

$$\cos \theta = -\frac{\sqrt{11}}{6}$$

$$\begin{aligned} \tan \theta &= \frac{-5}{-\sqrt{11}} \cdot \frac{\sqrt{11}}{\sqrt{11}} \\ &= \frac{5\sqrt{11}}{11} \end{aligned}$$