

MAT123

Signs of Trigonometric Functions

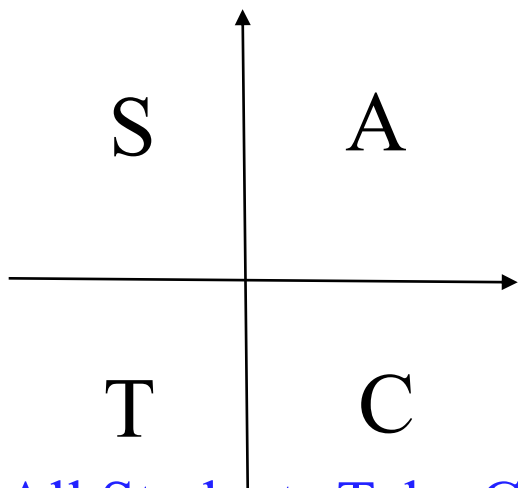
Signs of Trigonometric Functions

xy -plane is separated into 4 **quadrants**

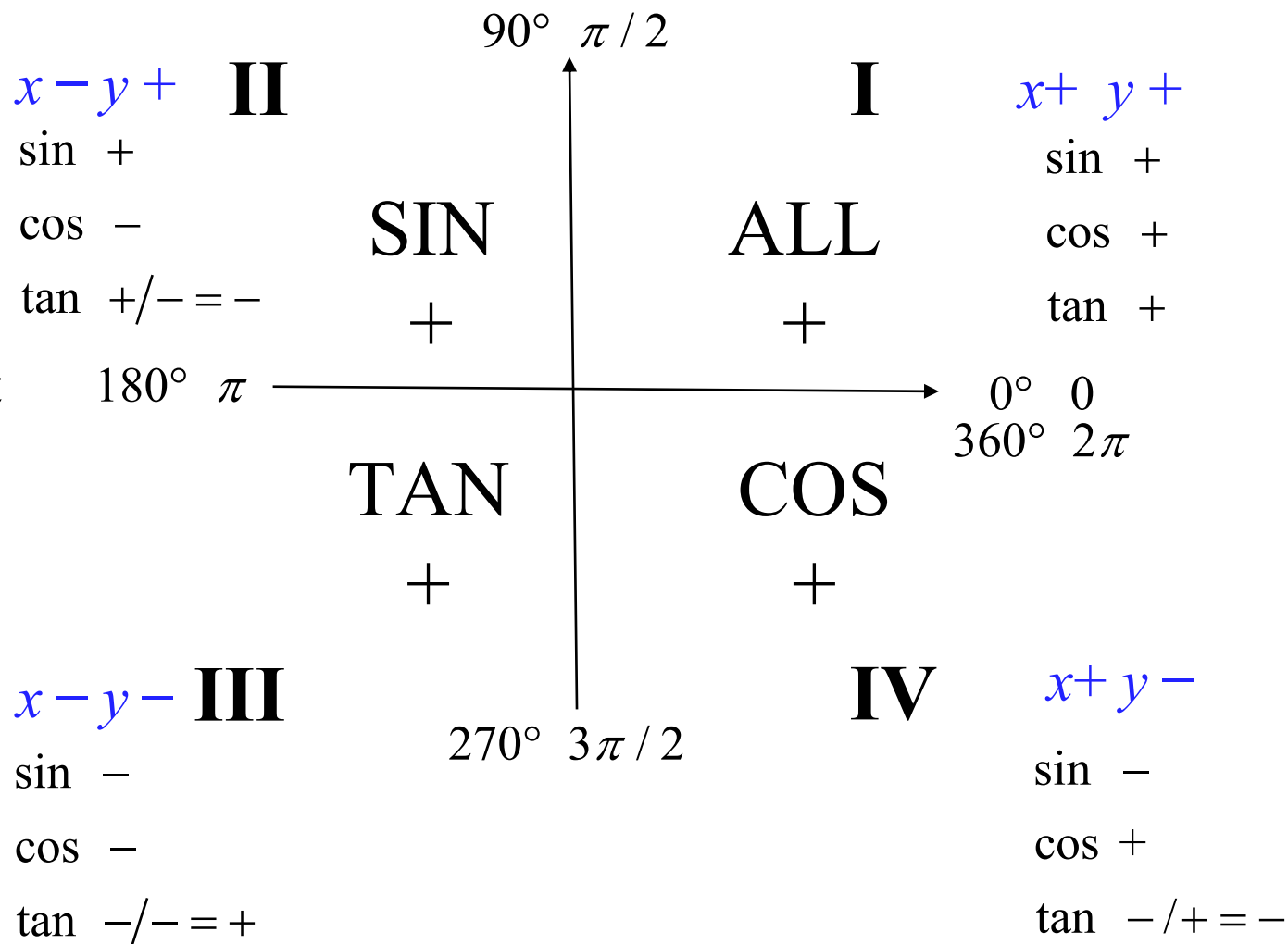
look at the sign of x and y in each quadrant

recall: $\sin \theta = \frac{y}{r}$
 $\cos \theta = \frac{x}{r}$
 $\tan \theta = \frac{y}{x}$

shortcut:



“All Students Take Calculus”



note: reciprocals follow same pattern

Quadrant Examples

i.e., negative

positive

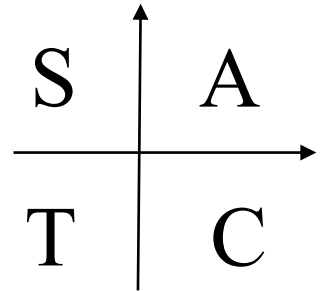
ex. if $\tan \theta < 0$ and $\cos \theta > 0$ then name the quadrant in which θ resides

$\downarrow$
– in II, IV

$\downarrow$
+ in I, IV

A: Q IV

Do: if $\sin \theta < 0$ and $\cos \theta < 0$ then name the quadrant in which θ resides



Find Trig Ratios with Quadrants

S	A
T	C

ex. Given $\tan \theta = -\frac{2}{3}$ and $\sin \theta > 0$. Find $\cos \theta$, $\csc \theta$.

$\tan \theta = -\frac{2}{3}$
 $\downarrow$
 - in $\textcircled{\text{II}}, \textcircled{\text{IV}}$

$\sin \theta > 0$
 $\downarrow$
 + in $\textcircled{\text{I}}, \textcircled{\text{II}}$

in II, $\cos -$
 in II, $\csc +$

Determine H :

$$OPP^2 + ADJ^2 = HYP^2$$

$$2^2 + 3^2 = H^2$$

$$4 + 9 = H^2$$

$$13 = H^2$$

$$H = \sqrt{13}$$

$$\cos \theta = \frac{A}{H} = -\frac{3}{\sqrt{13}} \cdot \frac{\sqrt{13}}{\sqrt{13}} = -\frac{3\sqrt{13}}{13}$$

$$\csc \theta = \frac{H}{O} = \frac{\sqrt{13}}{2}$$

SOH CAH TOA

Find Trig Ratios - Do

Do: Given $\cos \theta = -\frac{1}{4}$ and $\sin \theta < 0$. Find $\tan \theta$.

$$= \boxed{\sqrt{15}}$$

