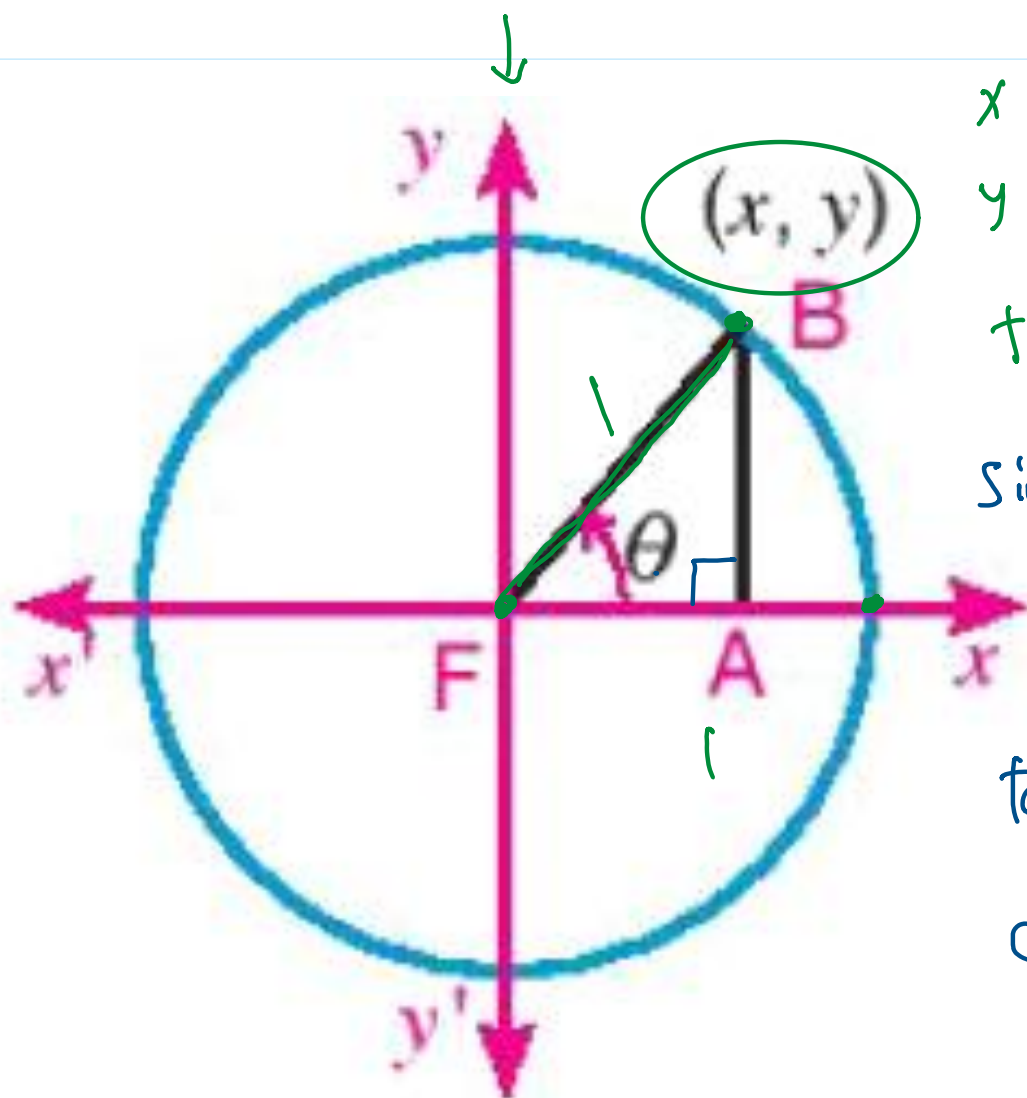


Revision

Sunday, November 2, 2025 7:57 AM



$$x = \cos \theta$$

$$y = \sin \theta$$

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

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

$$\cos \theta = \frac{1}{\sec \theta}$$

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

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

Screen clipping taken: 11/2/2025 7:57 AM

$$\begin{aligned} & \cos 120 + \tan 225 \\ &= \cos (180 - 60) + \tan (180 + 45) \\ &= \cos 60 + \tan 45 \\ &= -\frac{1}{2} + 1 = \boxed{\frac{1}{2}} \end{aligned}$$

$$\begin{cases} 180 - \theta & | & 270 - \theta \\ 180 + \theta & | & 270 + \theta \\ 360 - \theta \\ 90 + \theta \\ 90 - \theta \end{cases}$$

$$\sin 150 + \tan 240$$

$$\begin{aligned} \sin 150 & \rightarrow \sin (180 - 30) = \sin 30 = \frac{1}{2} \\ \text{2nd} & \rightarrow (180 - \theta) \rightarrow \theta = 30 \end{aligned} \quad \boxed{\frac{1}{2} + \sqrt{3}}$$

$$\begin{aligned} \tan 240 & = \tan (180 + 60) = \tan 60 = \sqrt{3} \\ \text{3rd} & \rightarrow (180 + 60) \Rightarrow \theta = 60 \end{aligned}$$

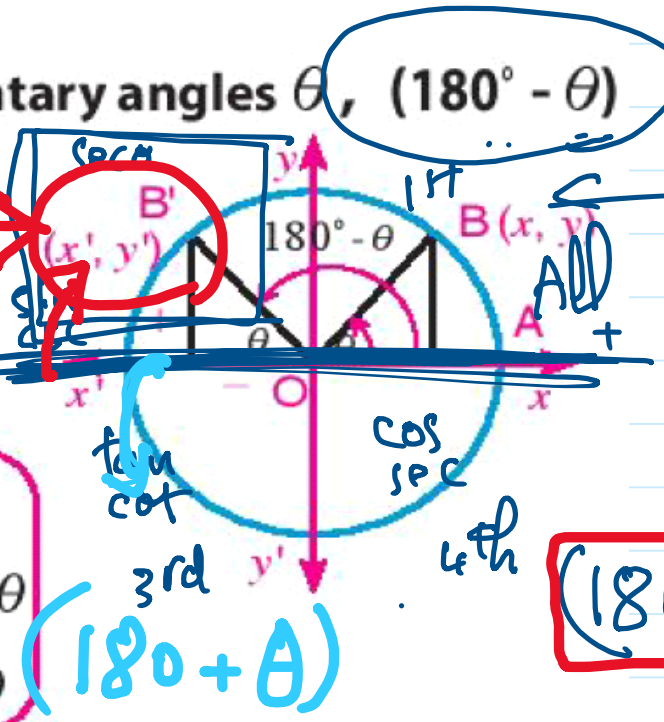
Related angles_1

Saturday, November 1, 2025 12:08 AM

1- Trigonometric functions of two supplementary angles θ , $(180^\circ - \theta)$

second quad.

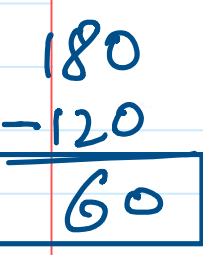
In the figure opposite, $B'(x', y')$ is the image of the point $B(x, y)$ by reflection in the y-axis, then $x' = -x$, $y' = y$ thus:



$$\begin{aligned} \sin(180^\circ - \theta) &= \sin \theta, \quad \csc(180^\circ - \theta) = \csc \theta \\ \cos(180^\circ - \theta) &= -\cos \theta, \quad \sec(180^\circ - \theta) = -\sec \theta \\ \tan(180^\circ - \theta) &= -\tan \theta, \quad \cot(180^\circ - \theta) = -\cot \theta \end{aligned}$$

For example: $\cos 120^\circ = \cos(180^\circ - 60^\circ) = -\cos 60^\circ = -\frac{1}{2}$

$\sin 135^\circ = \sin(180^\circ - 45^\circ) = \sin 45^\circ = \frac{1}{\sqrt{2}}$



120 → 2nd → 180 - theta → 1 → 3rd → 60

angle 1st quad

2S, 3S, 4S, 5S, 6S

cos 120 = cos(180 - 60) = -cos 60 = -1/2

2- Trigonometric functions of angles of measures θ , $(180^\circ + \theta)$

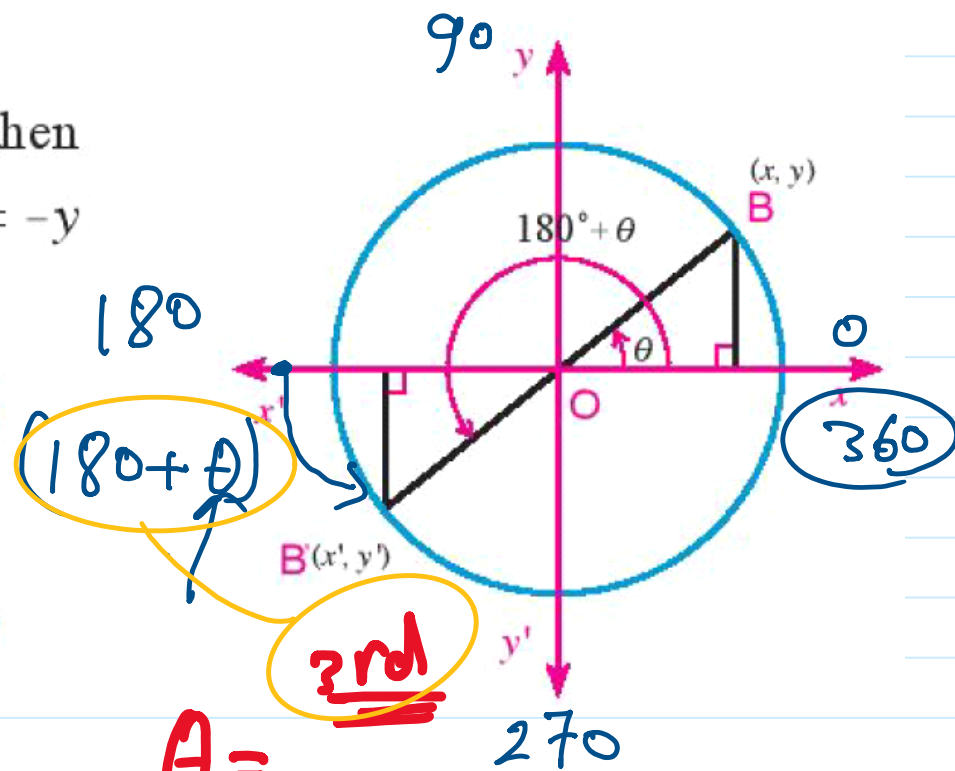
In the figure opposite :

$B'(x', y')$ is the image of the point $B(x, y)$ then

$x' = -x$, by reflection in the origin point then $y' = -y$

thus:

$$\begin{aligned} \sin(180^\circ + \theta) &= -\sin \theta & \csc(180^\circ + \theta) &= -\csc \theta \\ \cos(180^\circ + \theta) &= -\cos \theta & \sec(180^\circ + \theta) &= -\sec \theta \\ \tan(180^\circ + \theta) &= \tan \theta & \cot(180^\circ + \theta) &= \cot \theta \end{aligned}$$



① select quad -
 $(180 - \theta)$ / $(180 + \theta)$
 2nd / 3rd

$\tan \theta = \frac{2}{3}$

$\theta = 34^\circ$

$\theta = 270$

$\theta = 180 + 34$

$\theta = 214$

$\tan 214 = \square$
 $\tan 34 = \square$

② $\theta = ??$

③ rules

3rd $\rightarrow 180 + \theta \rightarrow \theta = 30$ $\frac{210}{-180} = 30$

$\sin 210^\circ = \sin(180^\circ + 30^\circ) = -\sin 30^\circ = -\frac{1}{2}$

$\cos 225^\circ = \cos(180^\circ + 45^\circ) = -\cos 45^\circ = -\frac{1}{\sqrt{2}}$

$\tan 240^\circ = \tan(180^\circ + 60^\circ) = \tan 60^\circ = \sqrt{3}$

① $\cos 120 + \tan 225$

$\cos 120 = \cos(180 - 60) = -\cos 60 = -\frac{1}{2}$

① 2nd $\rightarrow (180 - \theta) \rightarrow \theta = 60$

$-\frac{1}{2} + 1 = \frac{1}{2}$ $\frac{180}{-120} = 60$

$\tan 225 = \tan(180 + 45) = \tan 45 = 1$

$\frac{225}{-180} = 45$

① 3rd $\rightarrow (180 + \theta) \rightarrow \theta = 45$