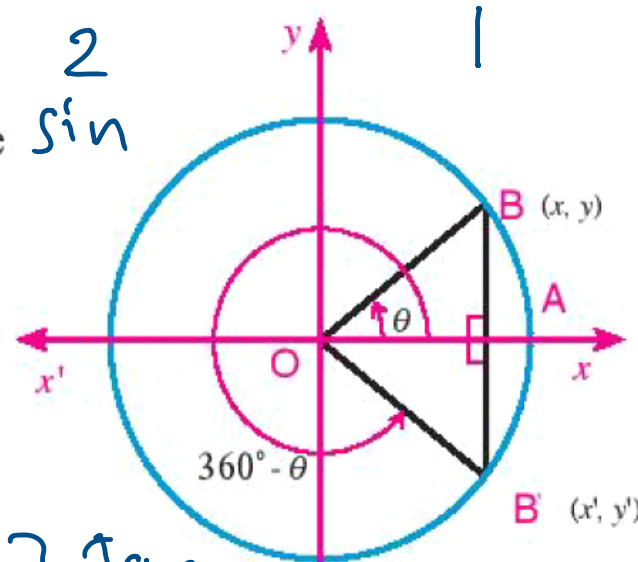


3- Trigonometric functions of angles of measures θ , $(360^\circ - \theta)$

In the figure opposite:

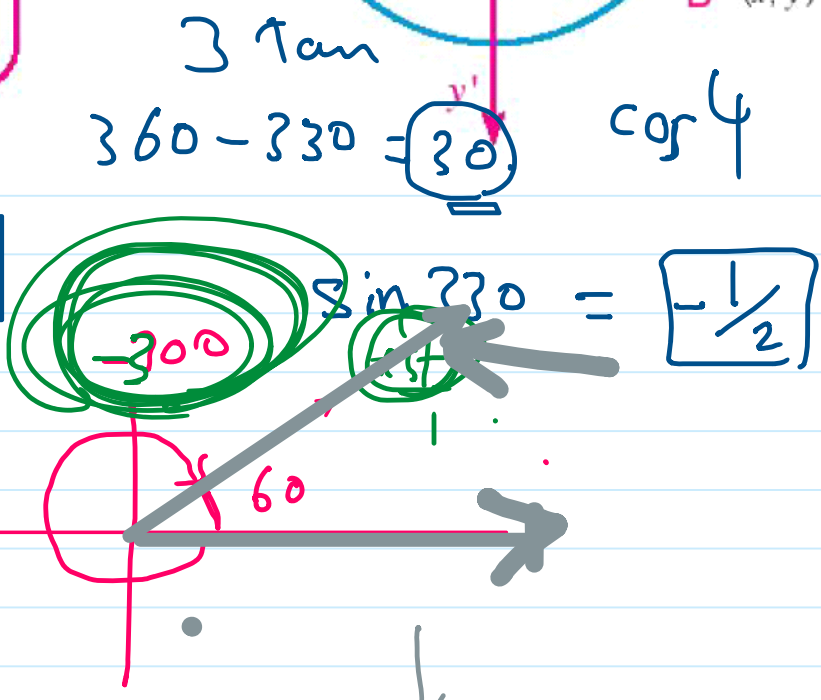
$B'(x', y')$ is the image of the point $B(x, y)$ by reflection in the x -axis then $x' = x$, $y' = -y$:



$$\begin{aligned} \sin(360^\circ - \theta) &= -\sin \theta & \csc(360^\circ - \theta) &= -\csc \theta \\ \cos(360^\circ - \theta) &= \cos \theta & \sec(360^\circ - \theta) &= \sec \theta \\ \tan(360^\circ - \theta) &= -\tan \theta & \cot(360^\circ - \theta) &= -\cot \theta \end{aligned}$$

2th $(360 - \theta)^\circ$

$$\begin{aligned} \sin 330^\circ &= \sin(360^\circ - 30^\circ) = -\sin 30^\circ = \boxed{-\frac{1}{2}} \\ \cos 315^\circ &= \cos(360^\circ - 45^\circ) = \cos 45^\circ = \frac{1}{\sqrt{2}} \end{aligned}$$



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$\cos -120$
 $\cos(-120 + 360)$

1 Without using the calculator, find the value of the expression:

$\sin 150^\circ \cos(-300^\circ) + \cos 930^\circ \cot(240^\circ)$

$930 - 360$
 equivalent angle

$$\begin{aligned} &\sin(180 - 30) \times \cos(-300 + 360) + \cos(930 - 360) \cot(180 + 60) \\ &\sin 30 \times \cos 60 + \cos 210 \times \cot 60 \\ &\frac{1}{2} \times \frac{1}{2} + \cos(180 + 30) \times \frac{\sqrt{3}}{3} \\ &\frac{1}{4} + \cos 30 \times \frac{\sqrt{3}}{3} \\ &\frac{1}{4} + \frac{\sqrt{3}}{2} \times \frac{\sqrt{3}}{3} = \frac{1}{4} + \frac{3}{6} = \boxed{\frac{3}{4}} \end{aligned}$$

4 Prove that: $\sin 600^\circ \cos (-30^\circ) + \sin 150^\circ \cos (-240^\circ) = -1$

$$= \sin(600 - 360) \cos(-30 + 360) + \sin(180 - 30) \cos(-240 + 360)$$

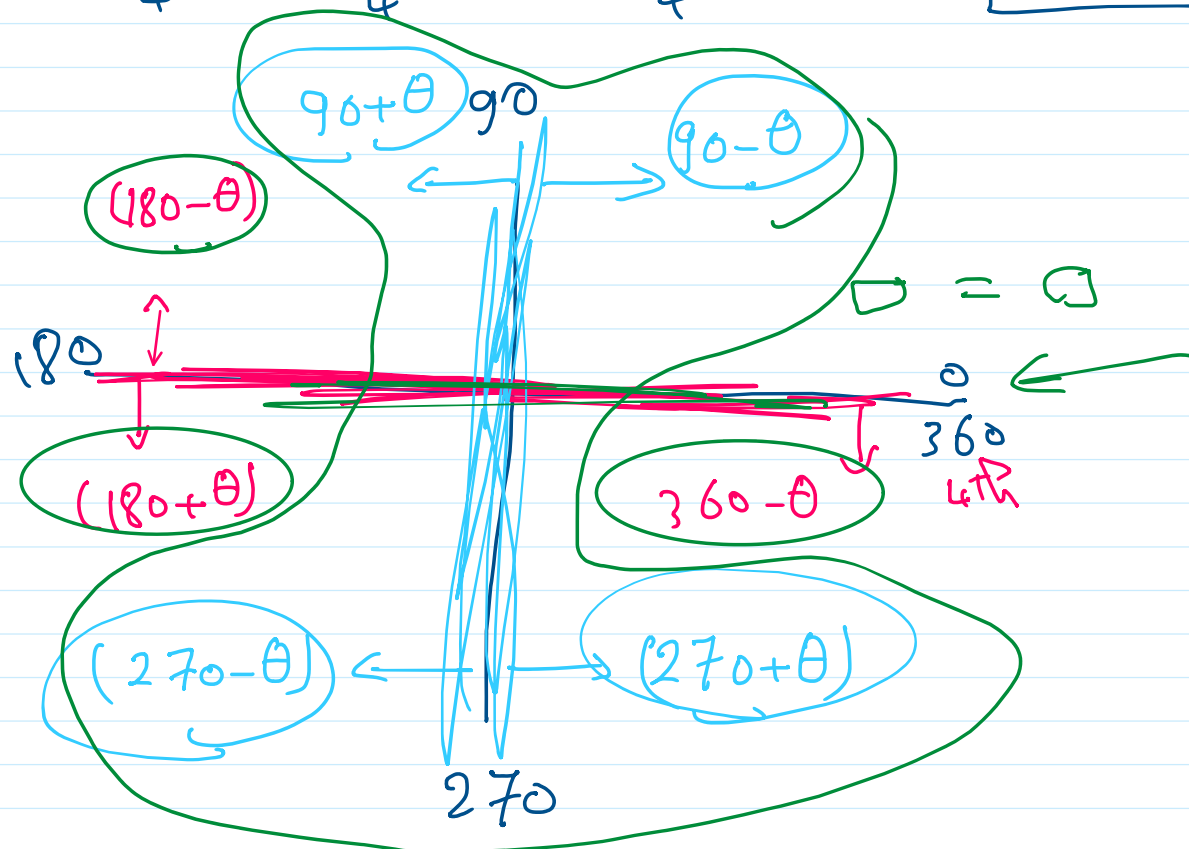
$$= \sin 240 \cos 330 + \sin 30 \cos 120$$

$$= \sin(180 + 60) \cos(360 - 30) + \frac{1}{2} * \cos(180 - 60)$$

$$= -\sin 60 * \cos 30 + \frac{1}{2} * -\cos 60$$

$$= -\frac{\sqrt{3}}{2} * \frac{\sqrt{3}}{2} + \frac{1}{2} * -\frac{1}{2}$$

$$= -\frac{3}{4} - \frac{1}{4} = -\frac{4}{4} = -1 = \text{R.H.S}$$



Related angles_5

Saturday, November 1, 2025 12:08 AM

4- Trigonometric functions of two complementary angles θ and $(90^\circ - \theta)$

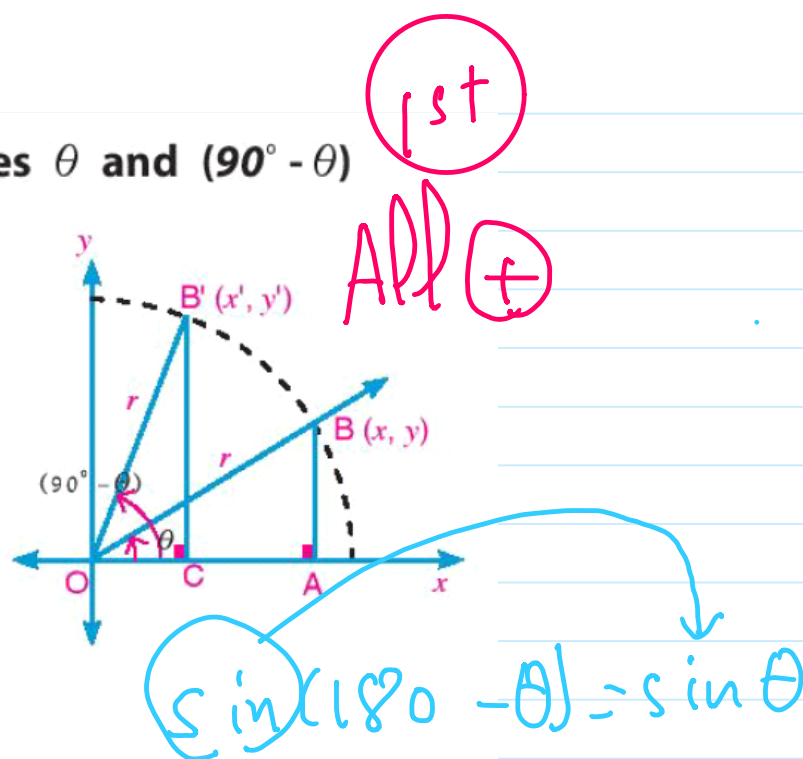
The figure opposite shows a part of a circle of centre O. The angle θ is drawn in the standard position to a circle of radius r.

from congruency of the two triangles $\triangle OAB$, $\triangle OC'B'$:

we get: $x' = y$, $y' = x$

Thus, it is possible to deduce all trigonometric functions of angles θ and $(90^\circ - \theta)$ as follows:

$$\begin{aligned} \sin(90^\circ - \theta) &= \cos \theta, & \csc(90^\circ - \theta) &= \sec \theta \\ \cos(90^\circ - \theta) &= \sin \theta, & \sec(90^\circ - \theta) &= \csc \theta \\ \tan(90^\circ - \theta) &= \cot \theta, & \cot(90^\circ - \theta) &= \tan \theta \end{aligned}$$



2) If the angle θ is in the standard position, and its terminal side passes through the point $(\frac{3}{5}, \frac{4}{5})$

$\frac{4}{5}$) then find the trigonometric functions: $\sin(90^\circ - \theta)$, $\cot(90^\circ - \theta)$

$$\begin{aligned} \cos \theta &= \frac{3}{5} \\ \sin \theta &= \frac{4}{5} \end{aligned}$$

$$\begin{aligned} \sin(90 - \theta) &= \cos \theta = \frac{3}{5} \\ \cot(90 - \theta) &= \tan \theta = \frac{\sin \theta}{\cos \theta} = \frac{4/5}{3/5} = \frac{4}{3} \end{aligned}$$

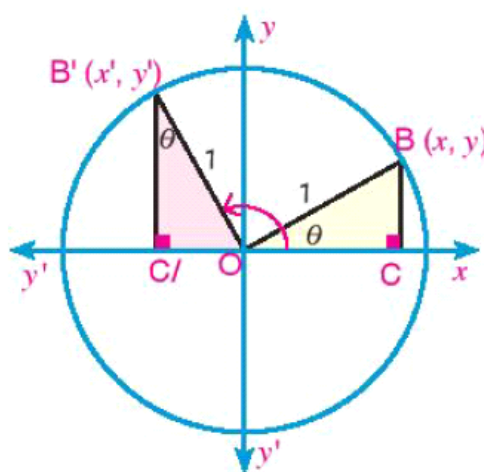
5- trigonometric functions of angles of measures θ and $(90^\circ + \theta)$

From congruency of the two triangles $\triangle B'C'O$, $\triangle OCB$

We get $y' = x$, $x' = -y$

thus, it is possible to deduce all trigonometric functions of angles θ and $(90^\circ + \theta)$ as follows:

$$\begin{aligned} \sin(90^\circ + \theta) &= \cos \theta, & \csc(90^\circ + \theta) &= \sec \theta \\ \cos(90^\circ + \theta) &= -\sin \theta, & \sec(90^\circ + \theta) &= -\csc \theta \\ \tan(90^\circ + \theta) &= -\cot \theta, & \cot(90^\circ + \theta) &= -\tan \theta \end{aligned}$$



3) If the angle θ is in the standard position and its terminal side passes through the point $(\frac{1}{3}, \frac{2\sqrt{2}}{3})$

$$(\frac{1}{3}, \frac{2\sqrt{2}}{3})$$

Find the trigonometric functions of: $\tan(90^\circ + \theta)$, $\csc(90^\circ + \theta)$