

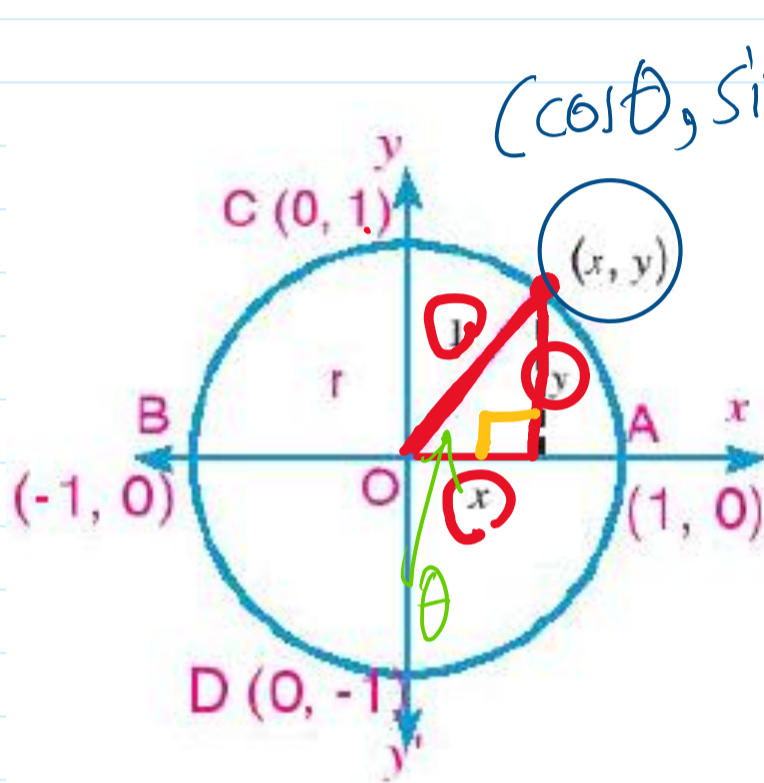
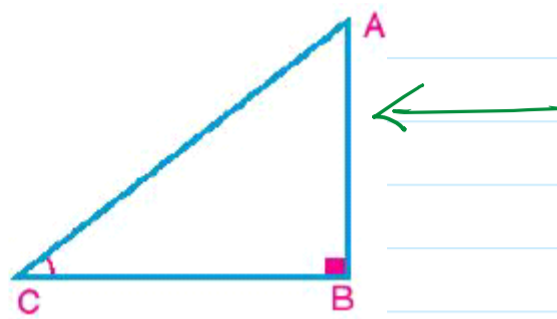
Trigonometric Function

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The unit Circle

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$$\begin{aligned} \sin C &= \frac{\text{opposite side}}{\text{hypotenuse}} = \frac{AB}{AC} \\ \cos C &= \frac{\text{adjacent side}}{\text{hypotenuse}} = \frac{BC}{AC} \\ \tan C &= \frac{\text{opposite side}}{\text{adjacent side}} = \frac{AB}{BC} \end{aligned}$$



$$x^2 + y^2 = 1$$

$$\sin \theta = \frac{y}{r} \Rightarrow$$

$$\boxed{y = \sin \theta}$$

$$\cos \theta = \frac{x}{r} \Rightarrow$$

$$\boxed{x = \cos \theta}$$

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Signs of the Trigonometric Functions

Second quadrant

The terminal side of the angle lies in the second quadrant, Thus, the sine and its reciprocal function are positive and the other function are negative.

First quadrant

The terminal side of the angle lies in the first quadrant, Thus, all trigonometric functions of the angle whose terminal side \overrightarrow{OB} are positive.

Third quadrant

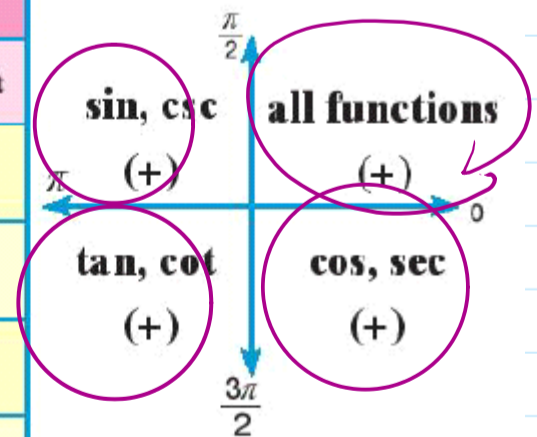
The terminal side of the angle lies in the third quadrant, Thus, the tangent and its reciprocal functions are positive and the other functions are negative.

Fourth quadrant

The terminal side of the angle lies in the fourth quadrant, Thus, the cosine and its reciprocal functions are positive and the other functions are negative.

Summary of signs of all trigonometric ratios:

the quadrant in which the terminal side of the angle lies	the interval in which the measure of the angle belongs	signs of trigonometric functions		
		csc, sin	cos, sec	tan, cot
First	$0, 90$ $]0, \frac{\pi}{2}[$	+	+	+
Second	$90, 180$ $]\frac{\pi}{2}, \pi[$	+	-	-
Third	$180, 270$ $]\pi, \frac{3\pi}{2}[$	-	-	+
Fourth	$270, 360$ $]\frac{3\pi}{2}, 2\pi[$	-	+	-



Lesson 1

Trigonometric Function 2

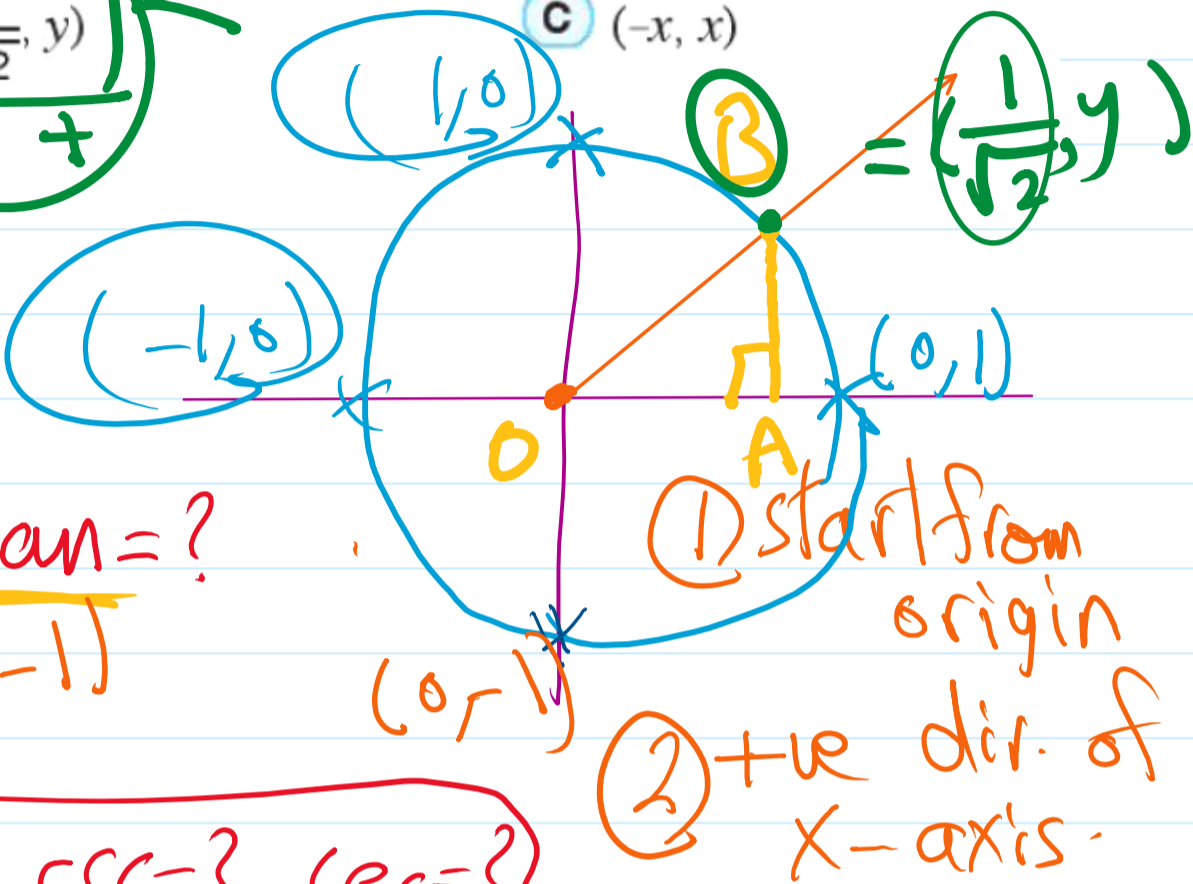
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2 If $\angle AOB$ is in the standard position and its terminal side intersects the unit circle at the point B and its measure is θ . Find the basic trigonometric ratios to the angle AOB, if the coordinates of the point B are as follows:

A (0, -1)
where $x > 0$, $y > 0$

B $(\frac{1}{\sqrt{2}}, y)$

C (-x, x)



Basic Trig.

sin = ? cos = ? tan = ?

All Trig. fun.
sin = ? cos = ? tan = ? csc = ? sec = ?
cot = ?

$x = 0$

$\cos \theta = 0$

$\cot = ?$

$y = -1$

$\sin \theta = -1$

$\tan \theta = \frac{\sin \theta}{\cos \theta} = \frac{-1}{0} = \text{undef.}$

$x = \frac{1}{\sqrt{2}}$

$\cos \theta = \frac{1}{\sqrt{2}}$

$y = y \Rightarrow \sin \theta = y$

$\theta = 45$

$\frac{1}{\sqrt{2}} \times \frac{\sqrt{2}}{\sqrt{2}} = \frac{\sqrt{2}}{2}$

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

$\sin \theta = \frac{\sqrt{2}}{2}$

$\tan 45 = 1$

$\tan \theta = \frac{\sqrt{2}}{2} \div \frac{1}{\sqrt{2}} = \frac{\sqrt{2}}{2} \times \frac{\sqrt{2}}{1} = \frac{2}{2} = 1$

If $270^\circ < \theta < 360^\circ$, $\sin \theta = -\frac{5}{13}$ find all basic trigonometric ratios of θ

30
60
45

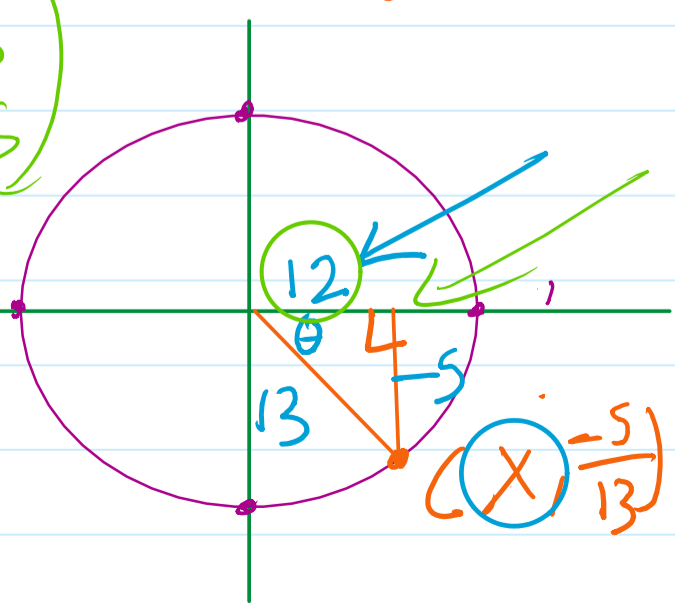
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$\sin \theta = -\frac{5}{13}$ opp hyp $y = -\frac{5}{13}$

$13^2 = (-5)^2 + x^2 \Rightarrow x = \sqrt{13^2 - 25}$

$\cos \theta = \frac{12}{13}$

$\tan \theta = -\frac{5}{12}$



If $270^\circ < \theta < 360^\circ$, $\sin \theta = -\frac{5}{13}$ find all basic trigonometric ratios of θ

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