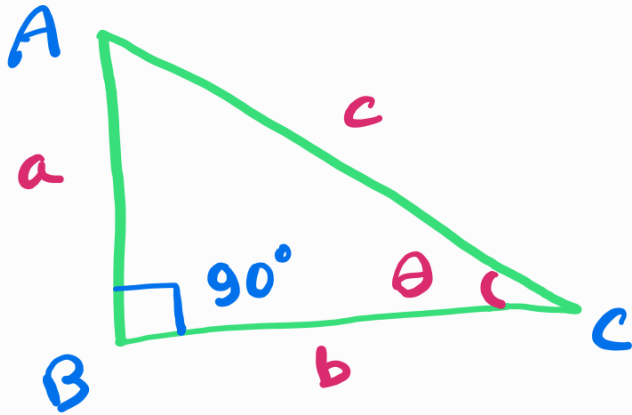


## Trigonometry — Angles



Trigonometry is the study of angles and sides of right-angle triangle.

with respect to the angle  $\theta$

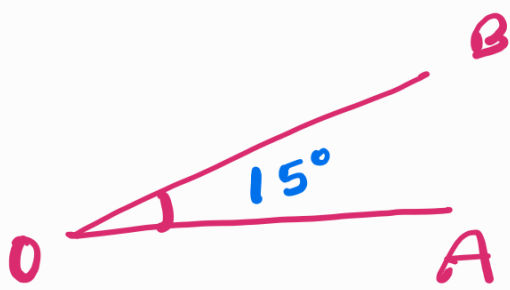
AB = Opposite side =  $a$

BC = Adjacent side =  $b$

AC = hypotenuse =  $c$

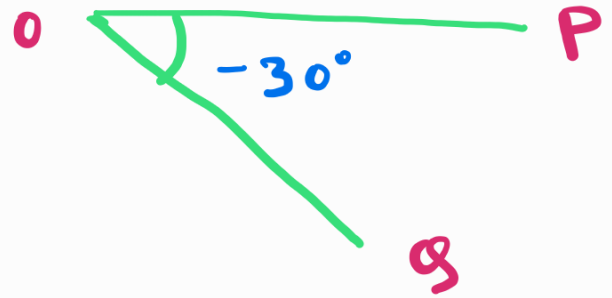
AC is the longest side.

As per Pythagoras theorem:  $a^2 + b^2 = c^2$



positive angle

Anti-clockwise



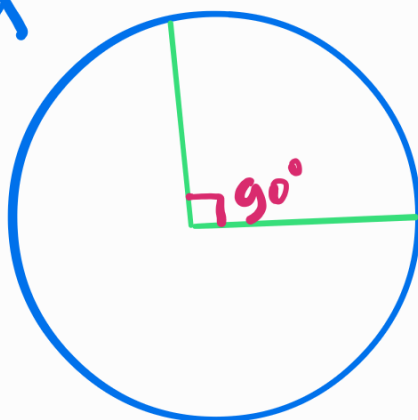
Negative Angle

clockwise

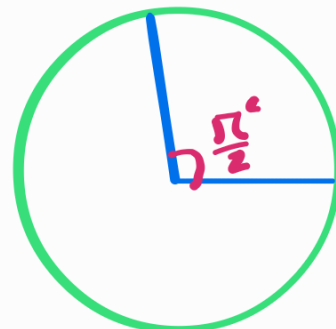
on a 2-D plane angle

can be from  $0^\circ$  to  $360^\circ$  in Geonetics. But in Trigonometry angles may be more than  $360^\circ$

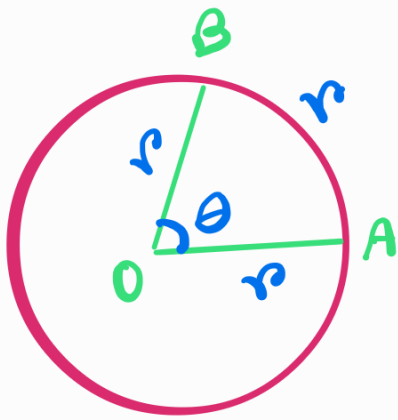
2 units of  
Angle



Degree

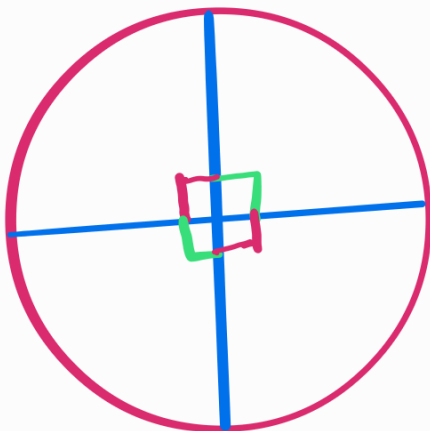


Radian



If the arc length is equal to the radius then the angle made by that arc in the centre is equal to 1 radian

$$\theta = \frac{AB}{r} = \frac{\text{arc length}}{r \text{ radius}}$$



The circle makes 4 Numbers of  $90^\circ$  angles at the Centre.  
So total angle is 360°

In radian the angle

$$\begin{aligned}\theta &= \frac{\text{Total arc length}}{\text{radius}} = \frac{\text{whole circle}}{\text{radius}} \\ &= \frac{\text{total Circumference}}{\text{Radius}} \\ &= \frac{2\pi r}{r} = 2\pi\end{aligned}$$

Therefore  $360^\circ = 2\pi$  radian

$$1^\circ = \frac{2\pi}{360} \text{ radian}$$

$$1^\circ = \frac{\pi}{180} \text{ radian}$$

Example:

$30^\circ = ?$  radian

Multiply  $\frac{\pi}{180}$  with Degree to get radian

$$\begin{aligned}\text{So, } 30^\circ &= 30 \times \frac{\pi}{180} \text{ radian} \\ &= \frac{\pi}{6} \text{ radian}\end{aligned}$$