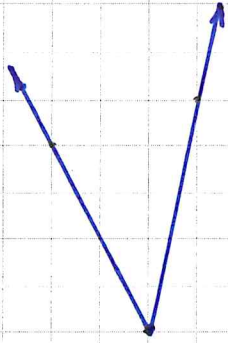


## 4.1 Angle Measure (I) - Degrees

DEFINITION: An angle is the union of two rays with a common endpoint.



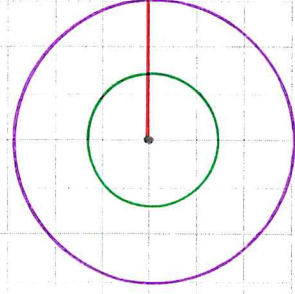
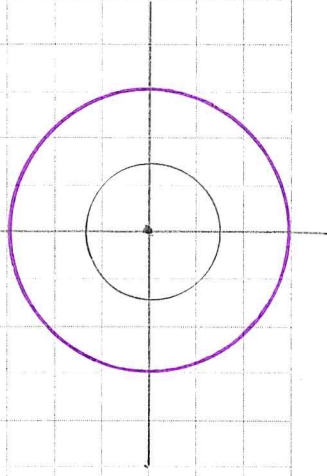
Names:

To measure an angle is to determine the amount of between one side and the other. (Commonly measured in )

Ex. Measure of  $\angle$  RAT =

QUESTION: What is a degree?

ANSWER:



Note: The measure of the angle does not depend on the size of the circle.

Finer divisions:

$\frac{1}{60}$  of a degree is called

$\frac{1}{60}$  of a is called

Thus  $1^\circ =$

Two formats:

a) Degrees - Minutes - Seconds

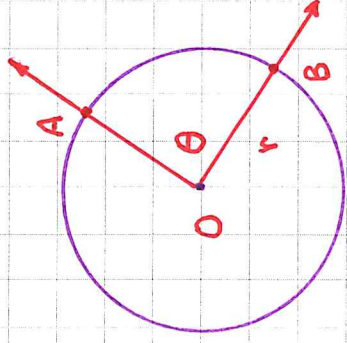
b) Decimal Degrees

Ex. ① a) Convert  $7^\circ 15' 30''$  to DD.

b) Convert  $12.345^\circ$  to DMS.

APPLICATION: Finding Arc Length

PROBLEM: Given  $r$  and  $\theta$ , find the length of  $\widehat{AB}$  ( $s$ ).



SOLUTION: Recall that circumference ( $C$ ) =

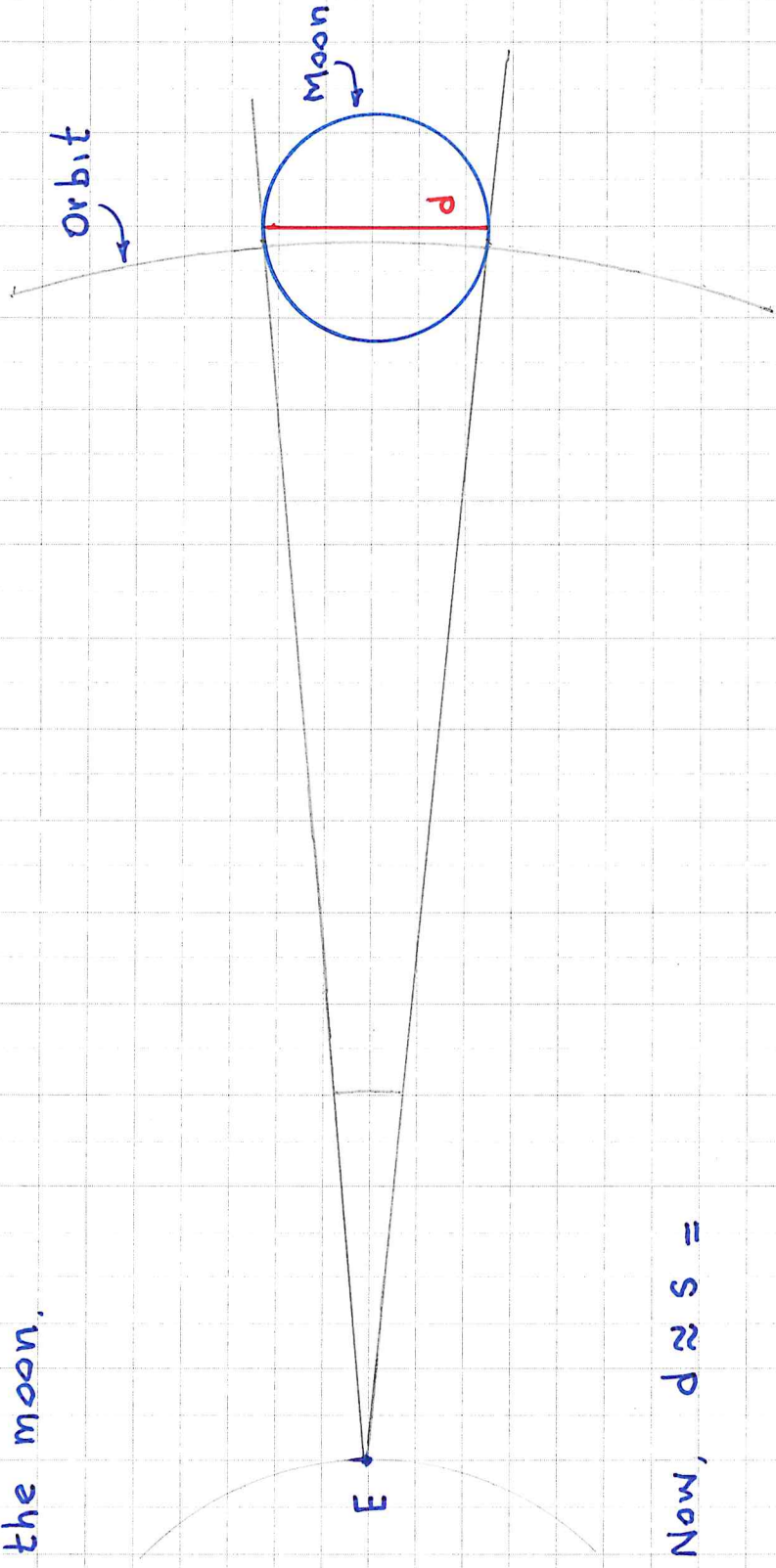
$$\text{So that } \frac{\text{Arc Length}}{\text{Circumference}} = \frac{s}{C}$$

Thus

Ex. ② A pendulum of length 4m swings through an arc of  $15^\circ$ .

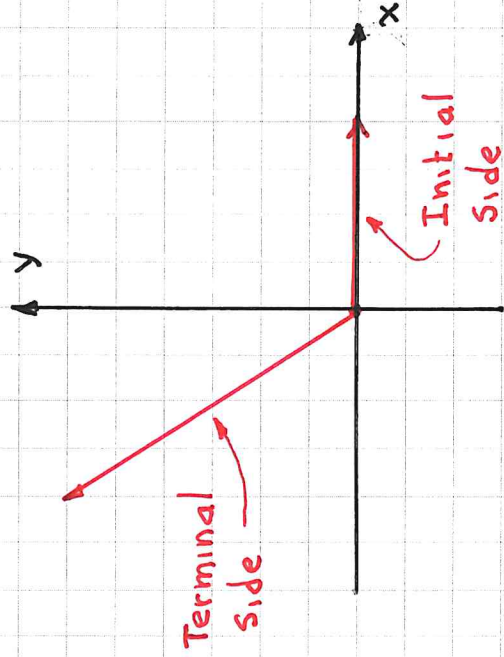
How far does the "bob" travel in one swing?

Ex. ③ Given that the radius of the moon's orbit is 240,000 miles and that the moon subtends an angle of  $\frac{1}{2}^\circ$ , use the arc length formula to approximate the diameter of the moon.



Now,  $d \approx s =$

DEFINITION: An angle is in STANDARD POSITION when its vertex is at the origin and its initial side lies along the positive x-axis.



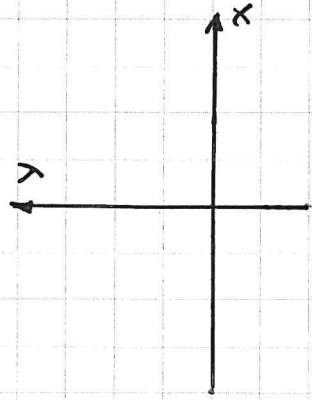
Counterclockwise Rotation



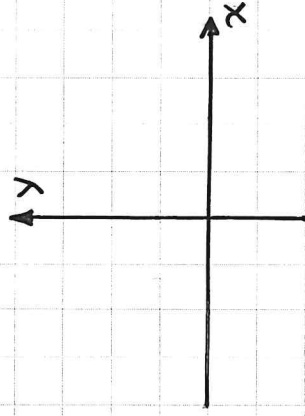
Clockwise Rotation

Ex. ④ Sketch the following angles in Standard Position.

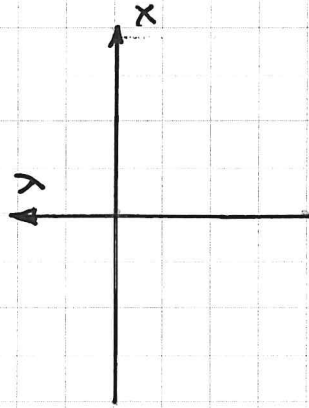
a)  $\alpha = 150^\circ$



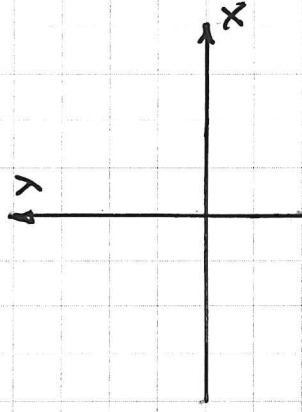
b)  $\beta = -90^\circ$



c)  $\gamma = 315^\circ$



d)  $\theta = 480^\circ$



Note: Two angles in Standard Position with the same terminal side are called

Ex: