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MATH 2312
Pre-Calculus II
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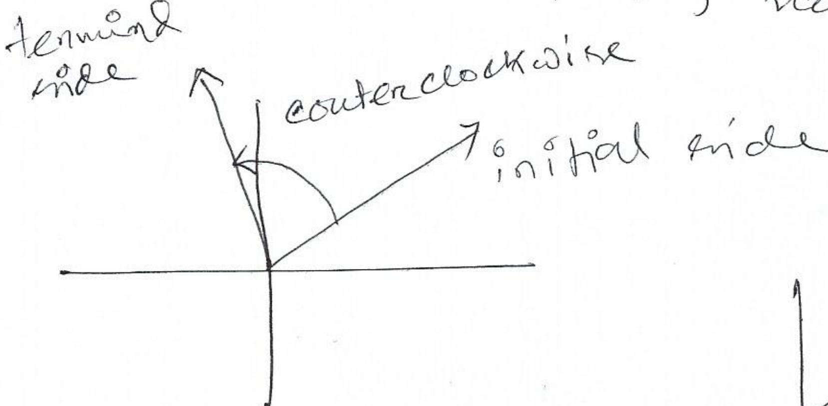
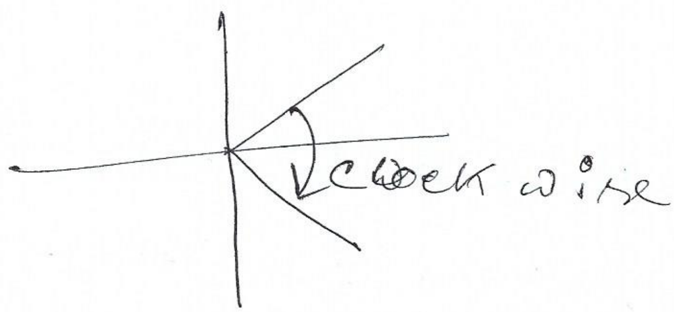
7.1 Angles & notations

Two rays share a common vertex from an angle.

We denote initial side, terminal side to indicate direction of notation.



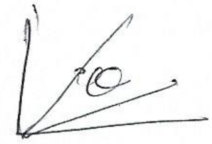


We identify an angle by the amount and direction of notation

CCW : Counter clockwise : positive notation

CW : clockwise : negative notation

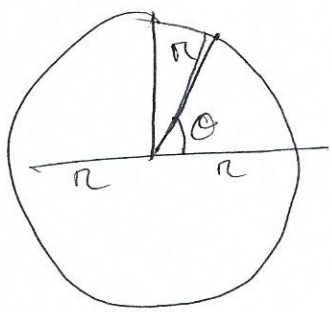
$\theta, \alpha, \beta, \gamma$.



Assume positive rotation unless indication.

1 degree $\frac{1}{360}$

1 radian $\frac{1}{2\pi}$



θ has measure of 1 radian because it intersects the arc of length r.

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

$\frac{360}{2\pi} = \frac{180^\circ}{\pi} = 1$ radian

1 degree $1^\circ = \frac{\pi}{180}$ radians.

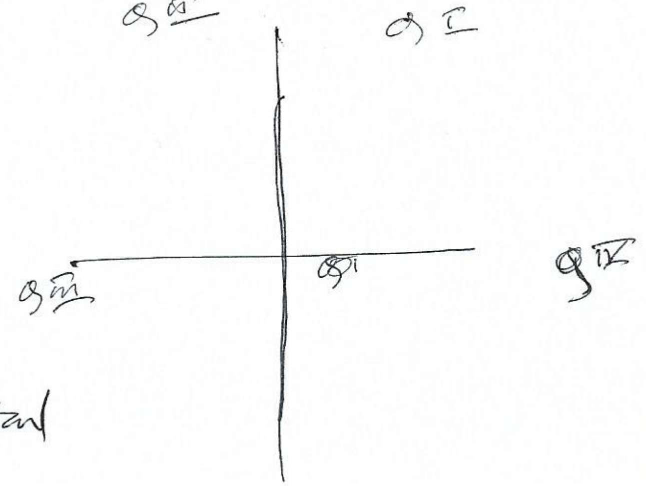
$225^\circ \cdot \frac{\pi}{180^\circ} = \frac{5}{4}\pi$

$\frac{3\pi}{2} \cdot \frac{180^\circ}{\pi} = 270^\circ$

θ initial on positive x axis

vertex at origin

Standard position



Terminal side lies within a quadrant.

When the TS lies on axis, we call the angle quadrantal

Arc length

Ratio of the central angles is equal to the ratio of the intersected arc lengths

$$\frac{\theta_1}{\theta_2} = \frac{s_1}{s_2}$$

Central angle

$$\frac{\theta}{\theta_1} = \frac{s}{s_1}$$ arc length

$\theta_1 =$ ~~2π~~ 1 radian

$s_1 = r$

$\theta_1 = 1$ radian

$s_1 = r$

$s = \theta r$

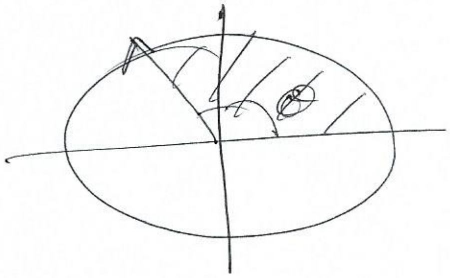
ex: find the length of arc of a circle with $r = 2m$ subtends a central angle measuring 0.25 radians

$s = r\theta$

$s = (2)(0.25)$

$s = 0.5$ m

Area of a sector of circle



$$\frac{\theta}{\theta_1} = \frac{A}{A_1}$$

$$\frac{\theta}{2\pi} = \frac{A}{\pi r^2}$$

$$A = \frac{\theta}{2\pi} \pi r^2$$

$$A = \frac{1}{2} r^2 \theta$$

Linear speed $v = \frac{s}{t}$

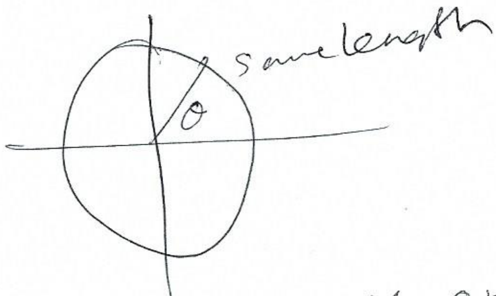
$s \to$ arc length = distance

$t \to$ time

angular speed, $\omega = \frac{\theta}{t}$

$\theta \to$ angle rotated through

$t \to$ time



$$v = \frac{s}{t} = \frac{r\theta}{t} = r\left(\frac{\theta}{t}\right) = r\omega$$

Rock on a sling that is 2ft long rotating at 180 revolutions per min.

Find, the ω angular speed

find v at the moment it is released.

$180 \times 2\pi = 360\pi$ radians / min

$\omega = 360\pi$

$v = \cancel{\frac{s}{t}} \quad r\omega$

$= 2 \times 360 = 720\pi$ ft.