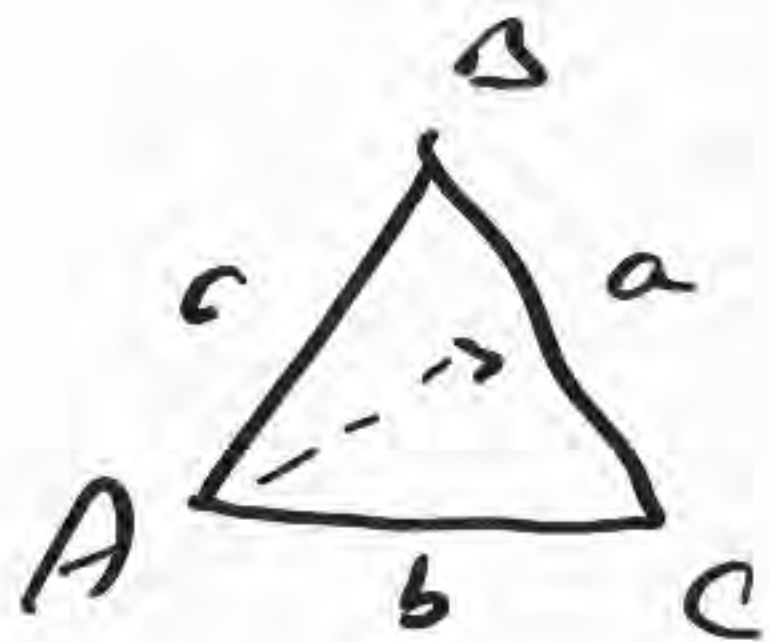


Lecture 6



note

Triangle $\triangle ABC$

A, B, C angles

$\angle BAC$, \hat{BAC} , $\angle A$ angle A

direction ABC



$$\begin{array}{r} - 90^\circ \\ 2d^\circ \quad 14' \end{array}$$

$$\begin{array}{r} - 89^\circ \quad 60' \\ 2d \quad 14' \\ \hline 65^\circ \quad 46' \end{array}$$

1 means 1 rad (rad)

1 deg " 1°
degree

deg/m

$$360^\circ = 2\pi \text{ rad} \quad \left. \begin{array}{l} \text{Full rotation} \\ 1 \text{ rev.} \end{array} \right\}$$

$$\pi = 180^\circ$$

$$45^\circ = 45^\circ \cdot \frac{\pi}{180^\circ} = \frac{\pi}{4} \text{ rad.}$$

$$249.8^\circ = \frac{2498^\circ}{10} \cdot \frac{\pi}{180^\circ}$$

$$= \frac{1249(\pi)}{900} \quad \frac{1249}{900} \pi$$

$$\approx 4.36 \text{ rad}$$

$$= \cancel{\approx}$$

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

$$\approx 57.3^\circ$$

$$1^\circ \neq 1$$

$$\frac{180^\circ}{\pi}$$

$$\frac{4\pi}{3} = \frac{4(180^\circ)}{3}$$

$$= 240^\circ$$

Section 2.2

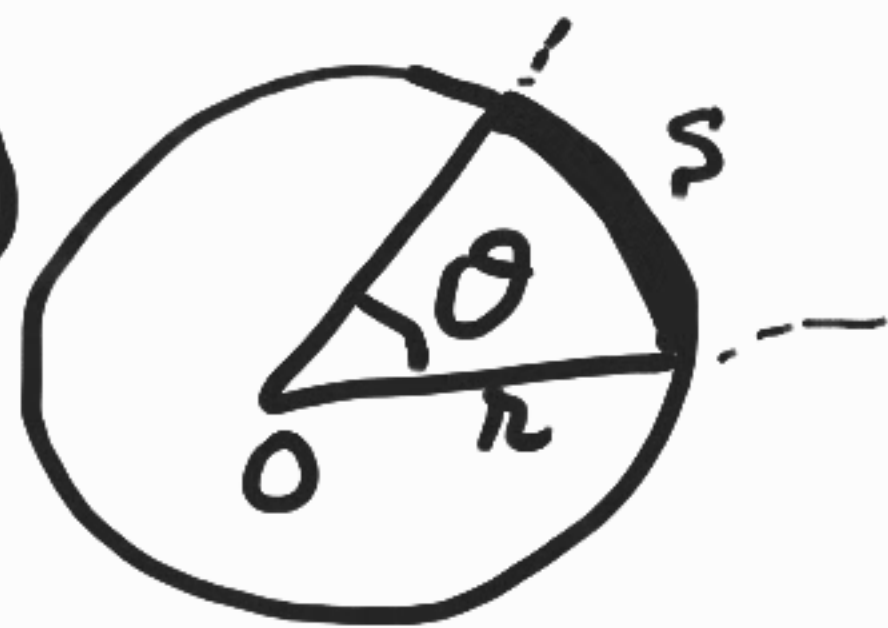
Arc length area / velocity

Defn

$s = r \theta \rightarrow (\text{rad})$

radius

central angle



Ex

$r = 3 \text{ cm}, s = 6 \text{ cm}$

$s = r \theta$

$6 = 3 \theta$

$\theta = 2 \text{ rad}$

$= 2 \frac{180^\circ}{\pi} = \left(\frac{360}{\pi} \right)^\circ$

Ex

$r = 18.20 \text{ cm} \quad \theta = \frac{3\pi}{8}$

$s?$

$s = r \theta$

$= \frac{182}{10} \frac{3\pi}{8}$

$= \frac{273}{40} \pi \text{ cm}$

$\frac{273\pi}{40}$

π

$\pi \approx 3.14$

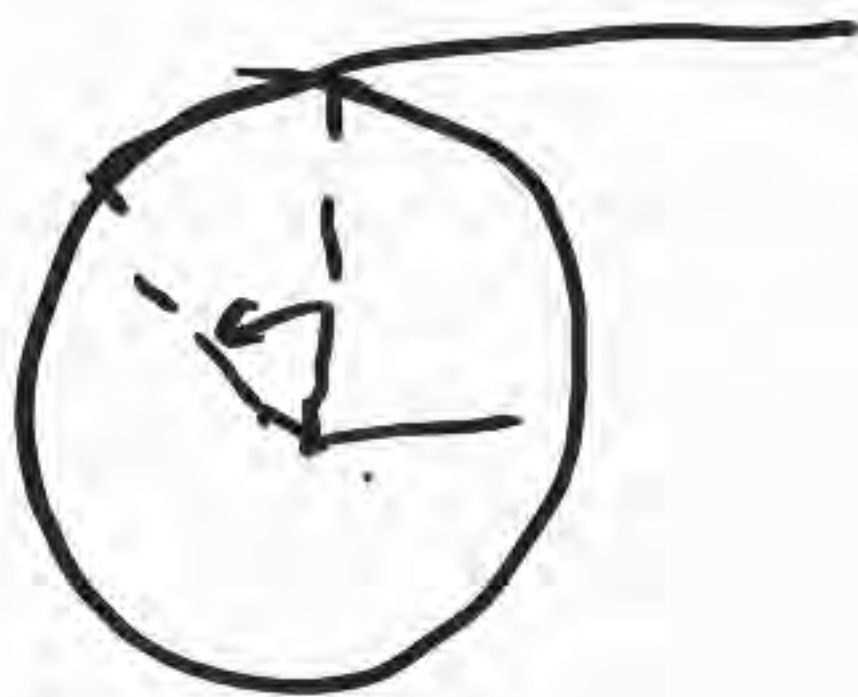
$$\theta = 39.72^\circ$$

$$= \frac{3972}{100}^\circ$$

$$r = .8725 \text{ ft}$$

$$s = \frac{8725}{10^4} \cdot \frac{3972}{10^2} \text{ ft}$$

$$= (8725)(3972) 10^{-6} \text{ ft}$$



ex $r = 6$ $\theta = 60^\circ$ $s?$

$$s = r\theta$$

$$= 6 \cdot 60^\circ \cdot \frac{\pi}{180^\circ}$$

$$= 2\pi \text{ unit}$$

Area of a sector

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



Ex $\theta = \frac{14}{10}$ $r = \frac{21}{10}$

$$Area = \frac{1}{2} \left(\frac{21}{10} \right)^2 \frac{7}{5}$$

$$= \frac{9.7^3}{10^3}$$

$$= \frac{3,087}{10^3} \text{ m}^2 \text{ unit}^2$$

9.73

Ex $\theta = 90^\circ = \frac{\pi}{2}$ $r = 30 \text{ ft}$

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

$$= \frac{1}{2} (30)^2 \frac{\pi}{2}$$

$$= \frac{900}{4} \pi$$

$$= 225 \pi \text{ ft}^2$$

$\theta = 45^\circ$ $r = 12$ $A?$

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

$$= \frac{1}{2} (12)^2 \frac{\pi}{4}$$

$$= 18 \pi \text{ unit}^2$$

$\frac{3}{10} \times \frac{6}{12}$
 $\frac{2}{12} \times \frac{4}{4}$

linear velocity (v) mi/hr

$$\text{speed} = |v| = \frac{\text{distance}}{\text{time}}$$

$$|v| = \frac{s}{t}$$

$$v = \frac{s}{t} \Rightarrow \boxed{\begin{array}{l} s = vt \\ r\theta = vt \end{array}}$$

Ex $s = 5 \text{ cm}$ $t = 2 \text{ sec}$

$$\begin{aligned} v &= \frac{s}{t} \\ &= \frac{5}{2} \text{ cm/sec} \end{aligned}$$

Angular speed: ω

$$\left[\omega = \frac{\theta}{t} = \frac{vt}{r} \cdot \frac{1}{t} \right]$$

$$\theta = \frac{vt}{r}$$

$$= \frac{v}{r}$$

$$\boxed{v = r\omega}$$

$\text{rpm} : \text{rev. per minute.}$

$$\begin{aligned}\omega &= 45 \text{ rpm} \\ &= 45 \frac{1 \text{ rev}}{1 \text{ min}} \cdot \frac{2\pi \text{ rad}}{1 \text{ rev}} \\ &= 90\pi \text{ rad/min}\end{aligned}$$

$$6.2 \quad 2 \text{ m scan} \quad \left. \begin{array}{l} S = 10 \\ A = \frac{1}{2} \lambda^2 \theta \end{array} \right\}$$

Ex \# 11

$$\lambda_1 = 2.5 = \frac{25}{10}$$

$$\lambda_2 = 4.8 = \frac{48}{10}$$

$$\theta_1 = 225^\circ$$



$$S = \lambda_1 \theta_1 = \lambda_2 \theta_2$$

$$\frac{25}{10} \cdot 9$$

$$\frac{5}{2} (225^\circ) = \frac{24}{5} \theta_2$$

$$\frac{5 \cdot 4 \cdot 9}{10 \cdot 48}$$

$$\theta_2 = \left(\frac{3 \times 5^4}{16} \right)^\circ$$

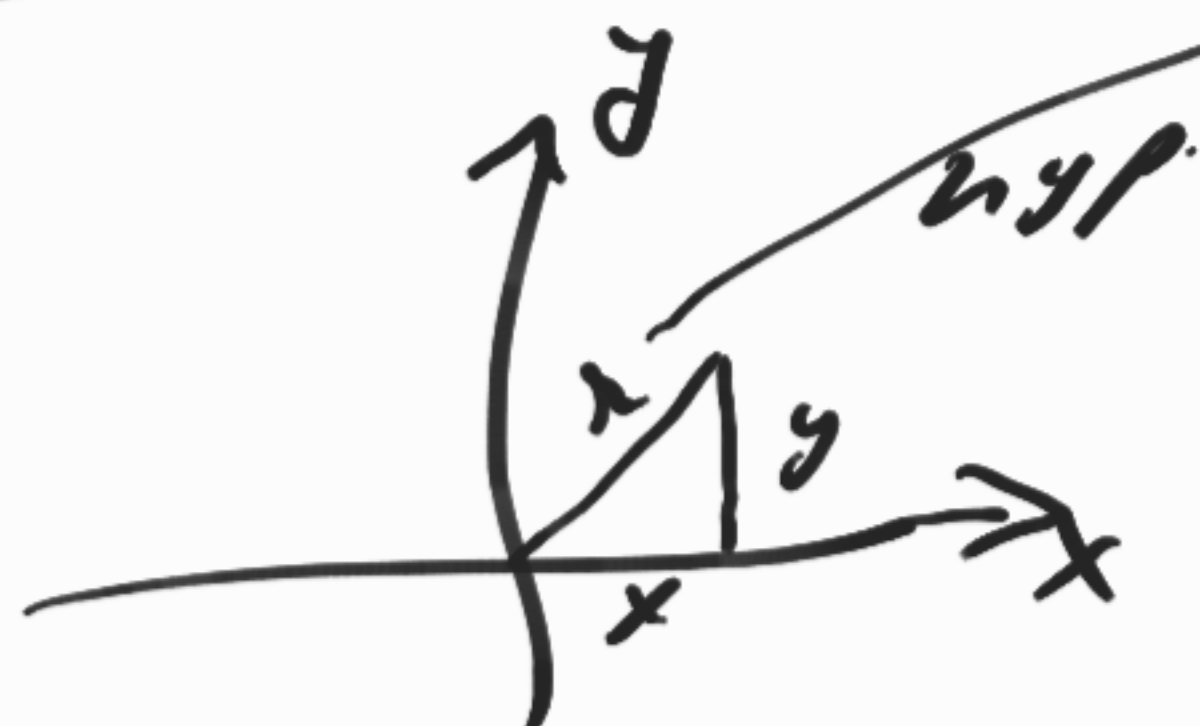
#20 $\lambda = 6$ in $\theta = 30^\circ = \frac{\pi}{6}$

$$s = r\theta$$

$$= 6 \cdot \frac{\pi}{6}$$

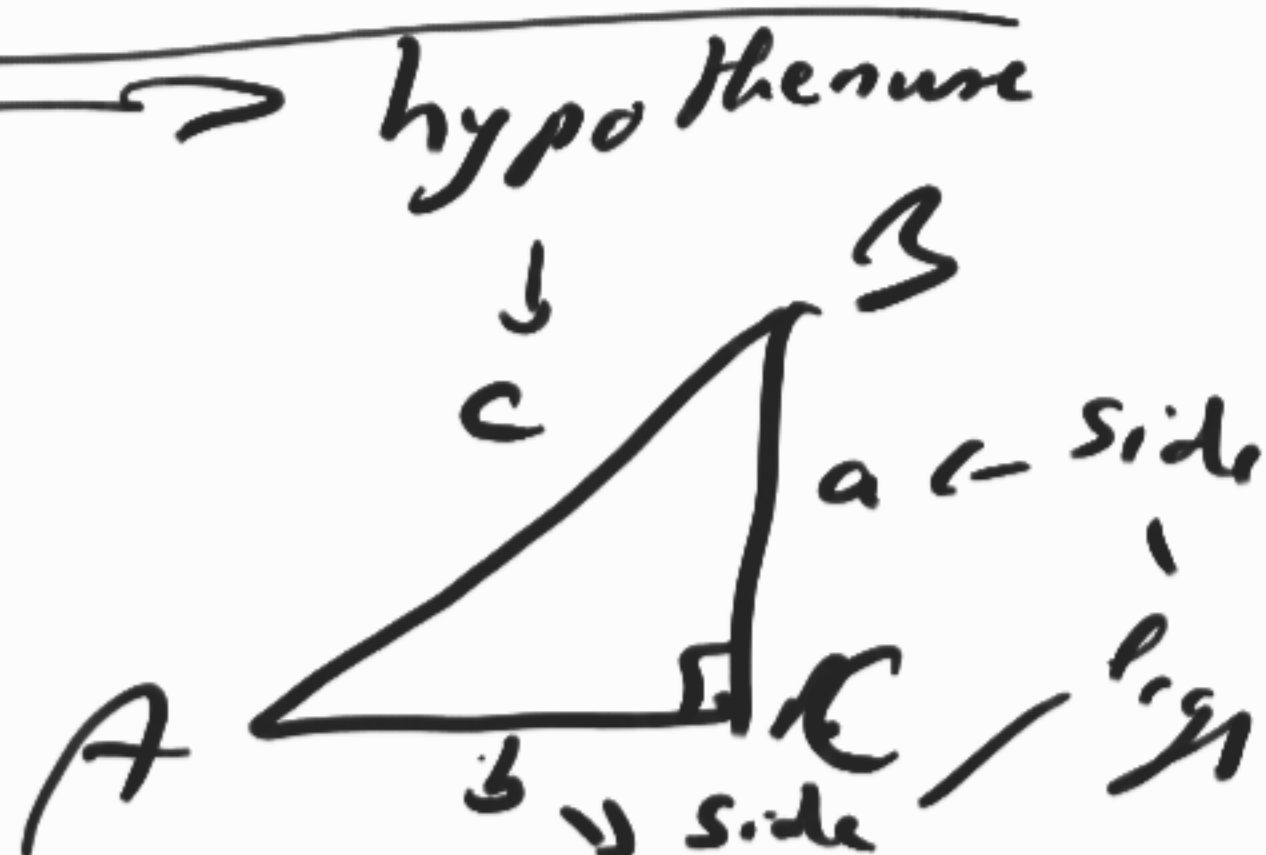
$$= \pi \text{ in}$$

$$30^\circ \cdot \frac{\pi}{180}$$



$$r^2 = x^2 + y^2$$

$$r = \sqrt{x^2 + y^2} \text{ hyp}$$



$$c^2 = a^2 + b^2$$

$$c = \sqrt{a^2 + b^2}$$

$$\left[\begin{array}{l} 3, 4 \rightarrow 5 \\ 5, 12 \rightarrow 13 \\ 8, 15 \rightarrow 17 \\ 7, 24 \rightarrow 25 \\ 20, 21 \rightarrow 29 \end{array} \right.$$

Cosine $\cos(\text{angle}) =$

Sine $\sin(\text{angle}) =$

Tangent $\tan \theta =$

Cotangent $\cot \theta =$

Secant $\sec \theta =$

Cosecant $\csc \theta =$

~~$\theta \tan$~~
 ~~$\tan =$~~

