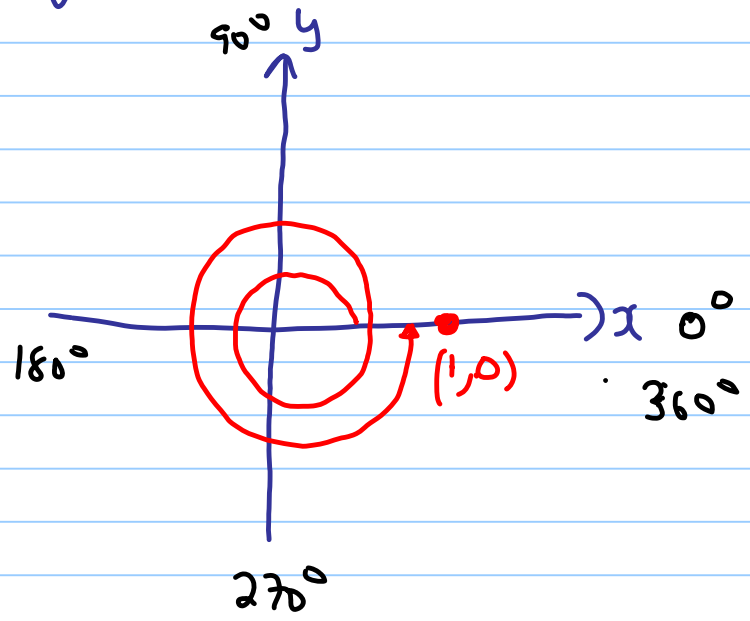
November 1, 2010

Note Title 11/1/2010

§6.4 #84

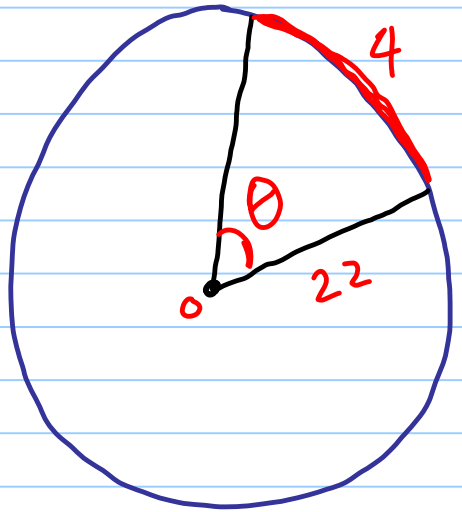


$$\sin\theta = \frac{y}{r} = \frac{0}{1}$$

$$\cos\theta = \frac{x}{r} = \frac{1}{1} = 1$$

6.6 Radian Measure

Example

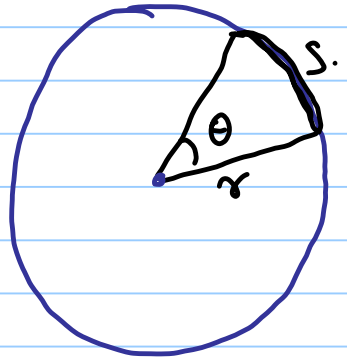


$$\theta = \frac{s}{r} \quad \therefore$$

$$= \frac{4}{22} \text{ radians}$$

$$= \frac{2}{11} \text{ radians}$$

Example



$r = 100\ cm$

$s = 20\ mm = 2\ cm$

$\theta = \frac{2}{100}$ radians

$= 0.02$ rad.

Recall:

Complete revolution $:: 360^\circ$

$S =$ Circumference $2\pi r$

$\theta_d \longleftrightarrow 360^\circ$

$\theta_r \longleftrightarrow 2\pi$

$$\frac{\theta_d}{\theta_r} = \frac{360^\circ}{2\pi r} \qquad \theta_d = \theta_r \cdot \frac{180^\circ}{\pi}$$

Example

$$60^\circ = 60^\circ \frac{\pi}{180^\circ} \text{ radians}$$

$$= \frac{\pi}{3} \text{ radians}$$

$$340^\circ = 340^\circ \times \frac{\pi}{180^\circ} \text{ radians}$$

$$= \frac{17\pi}{9} \text{ radians}$$

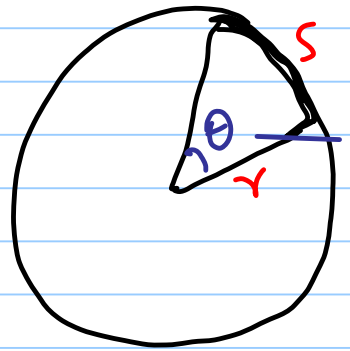
$$\frac{11\pi}{9} \text{ radian} = \frac{11\pi}{9} \times \frac{180^\circ}{\pi} \text{ degrees}$$

$$= 220^\circ$$

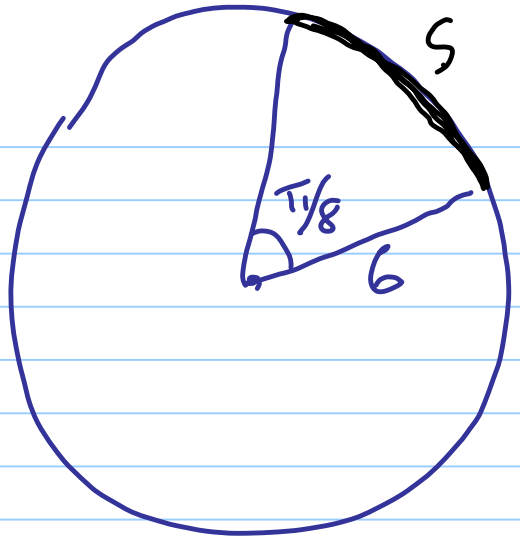
$$\frac{4\pi}{3} \text{ radians} = \frac{4\pi}{3} \cdot \frac{180^\circ}{\pi}$$

$$= 240^\circ$$

Arc length



$s = r\theta$ (θ rad.)

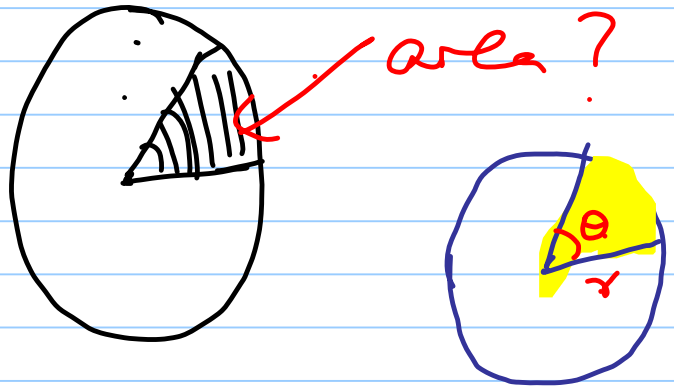


$S = r\theta \quad (\theta \text{ rad})$

$= (6)\left(\frac{\pi}{8}\right)$

$= \frac{3\pi}{4}$

sector



area ?

Recall:

area of circle $= \pi r^2$

$A_\theta = \; ?$

Example

$A = \frac{1}{2} r^2 \theta_r$ $\qquad r = 3$

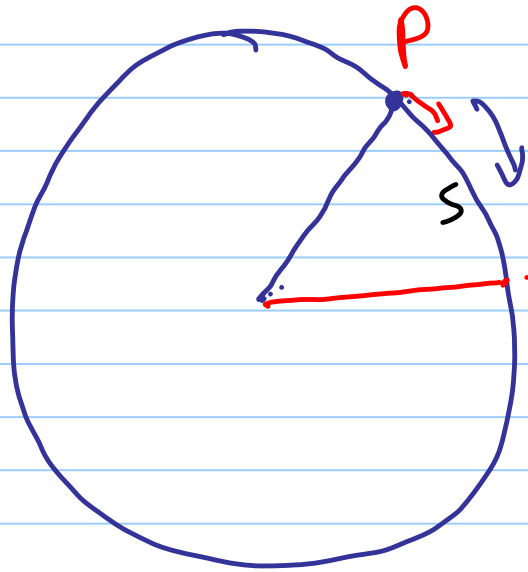
$\theta = \frac{\pi}{5}$

$A = \frac{1}{2}(3^2)\frac{\pi}{5}$

$= \frac{9}{10}\pi = 0.9\pi$

$\simeq 2.83$ (3 significant digits)

Linear Speed



$s = 12$ ft

$t = 3$ min

$V = ?$

$$V = \frac{s}{t} = \frac{12}{3} \text{ ft/min}$$

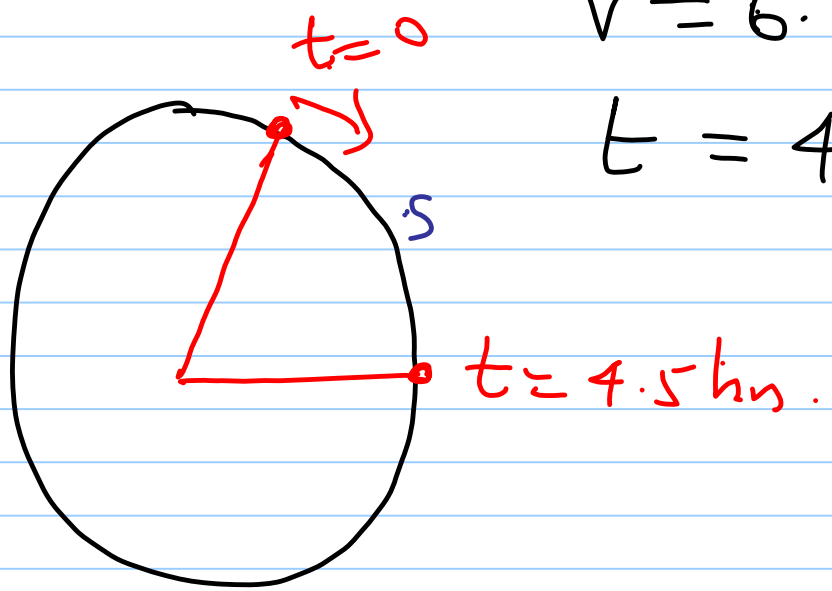
$$= 4 \text{ ft/min}$$

Example

$S = ?$

$v = 6.2 \text{ km/hr}$

$t = 4.5 \text{ hr}.$



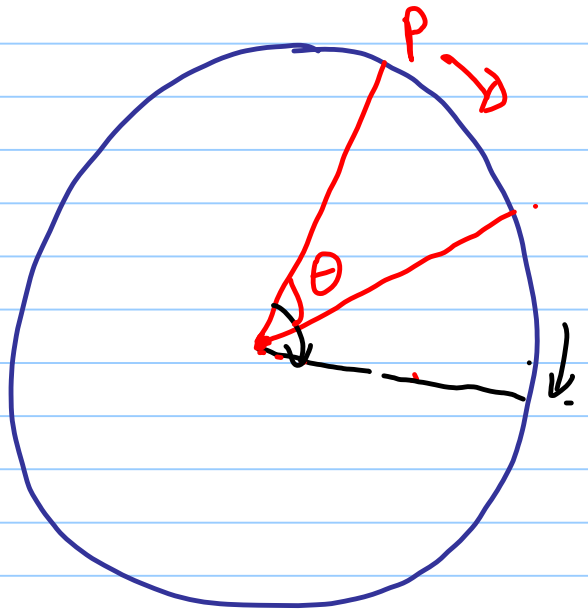
$$v = \frac{s}{t}$$

$$s = vt$$

$$= (6.2)(4.5) \text{ km}$$

$$=$$

Angular Speed



$$\omega = \frac{\theta}{t}$$

$$\theta = \frac{3\pi}{4}$$

$$t = \frac{1}{6}$$

$$\omega = \frac{3\pi/4}{1/6} = \frac{9\pi}{2} \text{ rad/sec.}$$