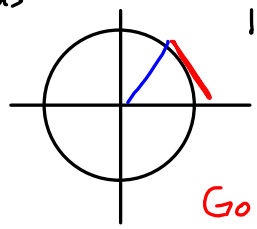
Steve Mills
EDBH 134 K

Semi:- flipped.

360° around full circle.

Radians one radian is the measure of the angle corresponding to an arc of length r = radius



1 radian is about 57°

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

Go around full circle: radius = 1

$S = r\theta$

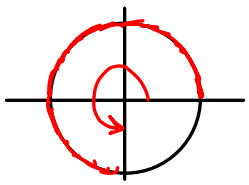
$2\pi = r\theta = 1 \cdot \theta = \theta$

2π radians gets you all the way around the circle

In general

$S = r\theta$.

What's the arc length corresponding to a circle of radius r = 5, subtended by angle of $\theta = 270°$?



$S = r\theta = 5 \cdot 270°$

$\frac{360 \text{ degrees}}{1 \text{ full circle}}$

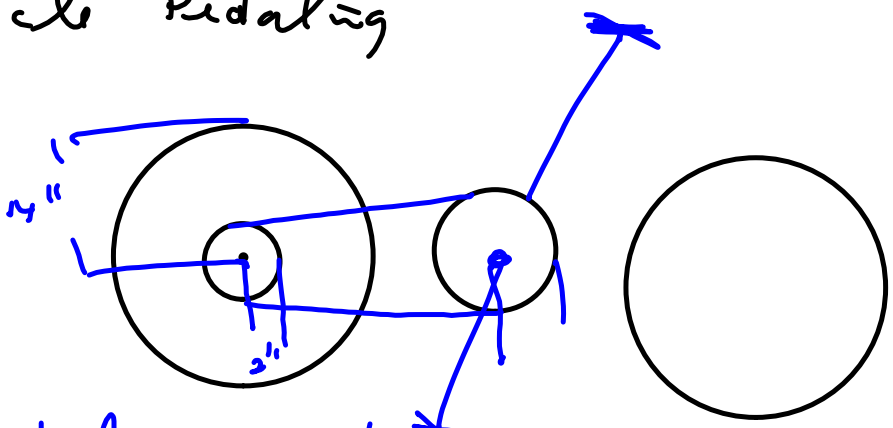
2π radians to one full circle.

$$\frac{\frac{360^\circ}{1 \text{ full circle}}}{\frac{2\pi \text{ radians}}{1 \text{ full circle}}} = \left(\frac{360^\circ}{1 \text{ full circle}}\right)\left(\frac{1 \text{ full circle}}{2\pi \text{ radians}}\right) = 1$$

$$= \frac{360}{2\pi} = \frac{180}{\pi}$$

$$(5 \cdot 270^\circ)\left(\frac{\pi \text{ radians}}{180^\circ}\right) = \frac{5 \cdot 270 \cdot \pi}{180} = \frac{15\pi}{2}$$

Bicycle Pedaling



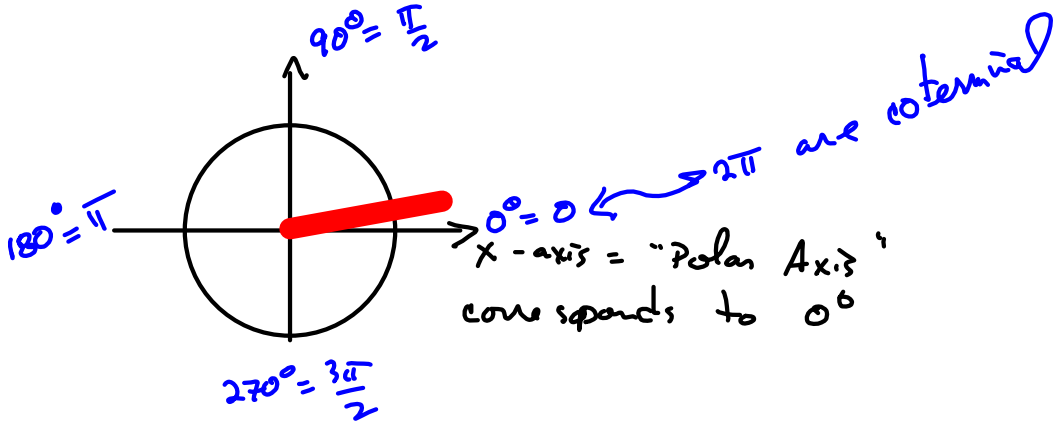
Pedaling a $2\frac{\text{rotations}}{\text{sec}}$

How fast is the bike moving?

$$\frac{2 \text{ revolutions front sprocket}}{1 \text{ sec.}} \cdot \frac{7}{2} \cdot \frac{\text{revolution rear sprocket}}{\text{revolution front sprocket}} \cdot \frac{2\pi \text{ radians}}{1 \text{ revolution rear}} \cdot \frac{\text{to angle in radians}}{1 \text{ sec}} \cdot \frac{1 \text{ rev rear wheel}}{1 \text{ rev rear sprocket}} \cdot 14 \text{ inches} \cdot \frac{1 \text{ foot}}{12 \text{ inches}}$$

$$\frac{s}{\text{sec}} = r\frac{\theta}{\text{sec}}$$

$$\frac{2 \cdot 7 \cdot 2\pi \cdot 14}{2 \cdot 12 \cdot 3} = \frac{49\pi}{3} \frac{\text{ft}}{\text{s}}$$



30° & -390° are coterminal.

Area of a sector subtended by an angle θ (in radians) of a circle of radius r is $\frac{1}{2}r^2\theta$

Area	Angle	Area of θ
πr^2	$2\pi = \theta$	
$= \frac{1}{2} \cdot 2\pi r^2$		
$\frac{1}{2}\theta \cdot r^2$	θ	
$\frac{\pi}{2}r^2 = \frac{1}{2} \cdot \pi \cdot r^2$	π	

No S 1.2. (Yet)

Jump to S 1.3.