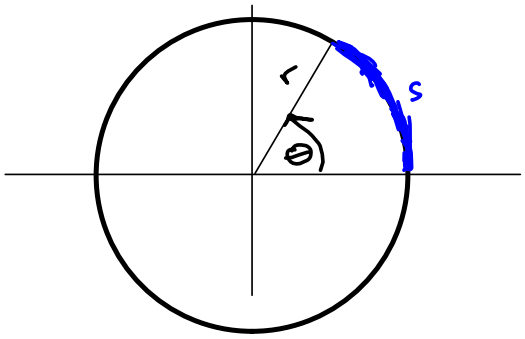
$\theta = \frac{s}{r} = \frac{\text{arc length}}{\text{radius}}$ = radian measure of θ.



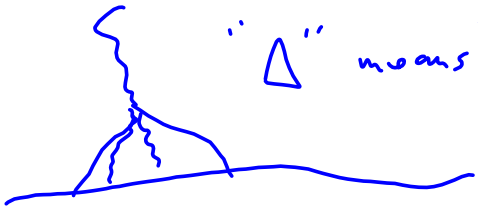
2π radians = ONE FULL REVOLUTION

$s = r\theta$ = Arc Length formula

Bicycle Question at end of 5.1 Homework on WebAssign

$$\text{Angular Speed} = \frac{\text{Change in Angle}}{\text{Change in Time}} = \frac{\Delta\theta}{\Delta t} \approx \frac{d\theta}{dt}$$

"Δ" means "Change."



$s = r\theta$ = Arc Length

Rate of speed of spinning wheel is

$$\frac{ds}{dt} = \frac{r\,d\theta}{dt} = \frac{d\theta}{dt} \cdot r$$

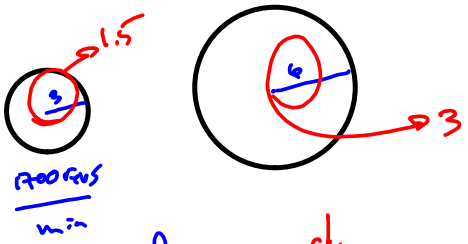
Relates revolutions/sec to ft/sec

S1.1 # 23

Given 1700 $\frac{\text{revs}}{\text{min}}$ on 3-inch pulley → Diameter!

$r = 3$ in → No! $r = \frac{D}{2} = 1.5$ in

connected to 6-inch pulley on a saw arbor.



Mis-read! Confused radius and diameter.

Want angular speed.

We know $s = r\theta$. want to get to $\frac{d\theta}{dt}$.

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

$\frac{d\theta}{dt} = \frac{\frac{ds}{dt}}{r} = \frac{\text{From Revs/min}}{1.5}$

(a) $\left(\frac{1700 \text{ revs}}{\text{min}}\right)\left(\frac{2\pi \text{ radians}}{1 \text{ rev}}\right) = \boxed{\frac{3400\pi \text{ radians}}{\text{min}}} = \frac{d\theta}{dt}$

Saw arbor ratio: $\frac{1.5}{3} = \frac{1}{2}$

means the saw is turning

(b) $\frac{1}{2}$ Times previous: $= \frac{1}{2}(3400\pi) = 1700\pi$