Definition of the Radian co.uk One radian is the angle θ subtended at the center of a tree by an arc length s regulater age radius R of the circle.



Example 2: A bicycle tire has a radius of 25 cm. If the wheel makes 400 rev, how far will the bike have traveled?

Previev

 $\theta = 2513$ rad

 $S = \theta R = 2513 \text{ rad} (0.25 \text{ m})$

3 70 ft

s = 628 m

Example 3: A rope is wrapped many times around a drum of radius 20 cm. What is the angular velocity of the drum if it lifts the bucket to 10 m in 5 19.



A Comparison: Linear vs. Angular



$$\mathbf{\mathcal{O}} = \overline{\boldsymbol{\omega}} t = \left(\frac{\boldsymbol{\omega}_0 + \boldsymbol{\omega}_f}{2}\right)$$

$$\omega_f = \omega_o + \alpha t$$

$$s = v_0 t + \frac{1}{2}at^2$$

$$s = v_f t - \frac{1}{2}at^2$$

$$2as = v_f^2 - v_0^2$$

$$\theta = \omega_0 t + \frac{1}{2} \alpha t^2$$

$$\theta = \omega_f t - \frac{1}{2}\alpha t^2$$

$$2\alpha\theta = \omega_f^2 - \omega_0^2$$