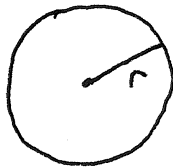


A spot of paint on a bicycle tire moves in a circular path of radius  $0.33\text{ m}$ . When the spot has traveled a linear distance of  $1.75\text{ m}$ , through what angle has the tire rotated?



$$C = 2\pi r = 2\pi (0.33\text{ m}) = 2.07\text{ m}$$

$$\frac{1.75\text{ m}}{2.07\text{ m}} = \frac{\theta}{2\pi}$$

$$\theta = 5.31\text{ rad}$$

If this occurred during a time interval of  $0.475$ , determine the angular velocity of the wheel and the linear velocity of the paint spot at an instant in time.

2

$$\omega = \frac{\theta}{\Delta t} = \frac{5.31 \text{ rad}}{0.475} = 11.30 \frac{\text{rad}}{\text{s}}$$

$$\boxed{11.3 \frac{\text{rad}}{\text{s}}}$$

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

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

$$v = \frac{\Delta x}{\Delta t}$$

$$v = r\omega$$

$$v = \frac{1.75 \text{ m}}{0.475} = \boxed{3.725 \text{ m/s}}$$

or

$$v = (0.33 \text{ m}) \left( 11.3 \frac{\text{rad}}{\text{s}} \right) = \boxed{3.73 \text{ m/s}}$$