

Disk rotating at constant
What is the angular velocity of
the wheel?

$$\theta = 2\pi \quad \text{Frame } 182 \rightarrow 343 \quad \omega = \frac{\theta}{t} \quad 2\pi \text{ radians} = 1 \text{ rotation}$$
$$t = \frac{161 \text{ frames}}{60 \text{ fps}} = 2.68 \text{ sec} \quad 343 - 182 = 161 \text{ frames}$$
$$\omega = \frac{\theta}{t} = \frac{2\pi \text{ radians}}{2.68 \text{ sec}} = 2.34 \frac{\text{radians}}{\text{sec}}$$

2. Find the tangential velocity for
the blue dot, red dot, & black dot

blue $r = 30 \text{ cm} = 0.3 \text{ m}$ $V = \omega r = (2.34 \frac{\text{rad}}{\text{s}})(0.30 \text{ m}) = 0.70 \frac{\text{m}}{\text{s}}$

red $r = 22 \text{ cm} = 0.22 \text{ m}$ $V = \omega r = (2.34 \frac{\text{rad}}{\text{s}})(0.22 \text{ m}) = 0.51 \frac{\text{m}}{\text{s}}$

black $r = 12 \text{ cm} = 0.12 \text{ m}$ $V = \omega r = (2.34 \frac{\text{rad}}{\text{s}})(0.12 \text{ m}) = 0.28 \frac{\text{m}}{\text{s}} = \omega_0$