



Flipping Physics Lecture Notes:

Introductory Tangential Velocity Problem

Example Problem: Three mints are sitting 3.0 cm, 8.0 cm, and 13.0 cm from the center of a record player that is spinning at 45 revolutions per minute. What are the tangential velocities of each mint?

Knowns:

$$r_1 = 3.0\text{cm}; r_2 = 8.0\text{cm}; r_3 = 13.0\text{cm}; \omega = 45 \frac{\text{rev}}{\text{min}} \left(\frac{2\pi\text{rad}}{1\text{rev}} \right) \left(\frac{1\text{min}}{60\text{sec}} \right) = 1.5\pi \frac{\text{rad}}{\text{s}}; v_t = ? \text{ (each)}$$

$$v_{t1} = r_1\omega = (3)(1.5\pi) = 14.1372 \frac{\text{cm} \cdot \text{rad}}{\text{s}} \approx 14 \frac{\text{cm}}{\text{s}}$$

$$v_{t2} = r_2\omega = (8)(1.5\pi) = 37.6991 \approx 38 \frac{\text{cm}}{\text{s}}$$

$$v_{t3} = r_3\omega = (13)(1.5\pi) = 61.2611 \approx 61 \frac{\text{cm}}{\text{s}}$$

The tangential velocity of an object is, by definition, tangent to the circle the object is describing. This means tangential velocity is, by definition, at a 90° angle to the radius of the circle.

