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Phys 2010 (NSCC), Fall 2006
Problem Set #10

1. A wheel has a radius of 3.2 m. How far does a point on the circumference travel if the wheel is rotated through angles of (a) 20 radians (b) 20 degrees (c) 20 revolutions. (In all cases use the arclength formula $s = \theta r$.)

2. If a rotating wheel makes 25.0 revolutions in one minute, find its average angular speed in $\frac{\text{rad}}{\text{s}}$.

3. A potter's wheel moves from rest to an angular speed of $0.25 \frac{\text{rev}}{\text{s}}$ in 40 s. Find its angular acceleration in $\frac{\text{rad}}{\text{s}^2}$.

4. A machine part rotates at an angular speed of $0.60 \frac{\text{rad}}{\text{s}}$; its speed is then increased to $2.2 \frac{\text{rad}}{\text{s}}$ at an angular acceleration of $0.70 \frac{\text{rad}}{\text{s}^2}$. Find the angle through which the part rotates before reaching this final speed.

5. What is the tangential acceleration of a bug on the rim of a 25.0-cm diameter disk if the disk moves from rest to angular speed of $78 \frac{\text{rev}}{\text{min}}$ in 3.0 s?

6. In Problem 4, when the disk is at its final speed, what is the tangential velocity of the bug?

7. A circular disk with a radius of 0.15 m rolls without slipping on a level surface with an angular speed of $6.5 \frac{\text{rev}}{\text{s}}$. What is the speed of the center of mass of the disk?

8. Calculate the net torque on the beam shown at the right about the point C .

