Name: _____

HW 8: Chapter 8

1. The Wheel Turns

A wheel rotates with a constant angular acceleration of $3.50\ rad/s^2$. If the angular speed of the wheel is $2.00\ rad/s$ at $t = 0$,

a. through what angle does the wheel rotation between $t = 0$ and $t = 2.00\ s$? Give your answer in radians and in revolutions.
b. What is the angular speed of the wheel at $t = 2.00\ s$?
c. What angular displacement (in revolutions) results while the angular speed found in part (b) doubles?

2. Rotating Disc

A compact disc rotates from rest up to an angular speed of 31.4 rad/s in a time of 0.892 s.

a. What is the angular acceleration of the disc, assuming the angular acceleration is uniform?
b. What angle does the disc turn while coming up to speed?
c. If the radius of the disc is 4.45 cm, find the tangential speed of a microbe riding on the rim of the disc when t = 0.892 s.
d. What is the magnitude of the tangential acceleration of the microbe at the given time?

3. Jacked Up Truck

Recall concept check 8.1. A truck's speedometer computes road speed from the wheel's angular speed, using the factory tire radius. The owner replaces the stock tires (diameter 78 cm) with larger ones (diameter 94 cm). Assume no slipping and that the speedometer calibration is not updated.

If the speedometer displays 23 m/s, what is the truck's actual speed? By how much and in which direction (over-read or under-read) is the speedometer in error?