Phys 2010 (NSCC), Fall 2007
Problem Set #10

1. Convert 16.0 radians to: (a) Revolutions. (b) Degrees.

2. If a rotating object has a constant angular velocity of $8.17 \frac{\text{rad}}{\text{s}}$, how many *revolutions* does it make in one minute? (One way to answer this is to convert units, from $\frac{\text{rad}}{\text{s}}$ to $\frac{\text{rev}}{\text{min}}$.)

3. A wheel starts rotating from rest and undergoes a constant angular acceleration. (a) In 10.0 s it makes 75.0 revolutions. What is the angular acceleration of the wheel? (b) What was the angular velocity at the end of the 10.0 s?

4. An object is rotating at a rate of 130 $\frac{\text{rad}}{\text{s}}$. It undergoes a constant angular deceleration and comes to rest in 12.0 s.

What is the magnitude of the angular acceleration of the object? How many turns did it make in coming to a halt?

5. A wheel of radius 55.0 cm is turning at a rate of 80.0 $\frac{\text{rev}}{\text{min}}$. What is the speed of a point on its rim?

6. A motorcycle is traveling at a speed of 22.0 $\frac{\text{m}}{\text{s}}$ has wheels of radius 30.0 cm. What is the angular velocity of its wheels?

If the motorcycle decelerates uniformly from 22.0 $\frac{\text{m}}{\text{s}}$ to rest in 15.0 s, what is the magnitude of the angular acceleration of the wheels?

7. Three forces are exerted on a rotating object at the distances and in the directions shown.

What is the total torque on the object? (Take "counter-clockwise" to be the positive sense of rotation.)

45.0 N

60°

30 cm

45 cm

70°

20 cm

21.0 N

40°

8.0 N
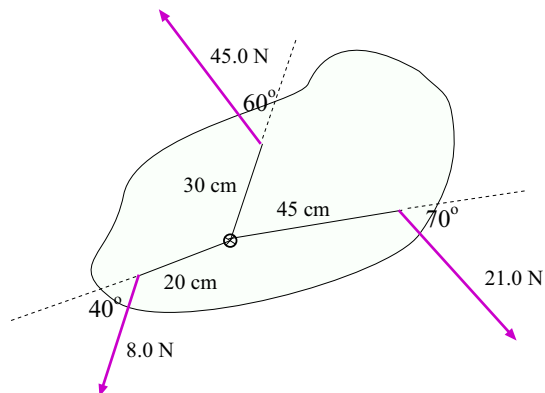
8. A 300-N sign is suspended from a horizontal 4.00-meter long uniform 100-N rod as indicated at the right. The sign is attached to the rod at a point which is 3.0 m from the wall; The left end of the rod is pivoted and the right end is supported by a thin cable making a 30.0° angle with the vertical.

Find the tension T in the cable.

30°

T

Ye Olde
Shoppe