Topics in class 1 - 7 - 19: Rotational Kinematics

- Circular vs. rotational motion
- What is a radian
- Angular position
- Angular Displacement
- Angular Velocity
- Linear vs. Angular Velocity
- Angular Velocity Conversions
- Angular Acceleration

Problems in class for 1-7-19
[the homework will contain these problems and many similar problems]

1. The earth undergoes both rotational motion and (nearly) circular motion.
Which creates day and night, circular or rotational motion?

Which create the seasons, circular or rotational motion?

2. Convert 30 rpm (revolutions per minute) to radians per second. Please use conversion factors and dimensional analysis to complete this conversion.

3. What is the angular velocity in radians per second of the minute hand of a clock?

4. What is the angular velocity of the earth in its rotation?

5. If a tire has a linear velocity of 22 m/s,
And a radius of 45 cm,
What is its angular velocity?

6. A car accelerates from rest to 15 m/s in a time of 2 seconds.
Its tires have a radius of 40 cm.

- What is the initial angular velocity of the tires?

- What is the final angular velocity of the tires?

- What is the angular acceleration of the tires?

7. A car accelerates for 10 m/s to 18 m/s in a time of 2 seconds.
Its tires have a radius of 42 cm.

- What is the initial angular velocity of the tires?

- What is the final angular velocity of the tires?

- What is the angular acceleration of the tires?

8. Determine (again) the angular velocity of the earth and then determine the linear velocity of a person at a latitude of 41.7 degrees north (Mattapoisett, MA).