AP Physics – Torque Wrapup

We got one really fine equation. Here it is:

$$\tau = rF\sin\theta$$

This is, of course, the good old torque equation. Recall that if the applied force is perpendicular to the lever arm (r), then the torque equation becomes: $\tau = rF$

Here's the stuff that master you must (as Yoda would say).

You should understand the concept of torque so you can:

a. Calculate the magnitude and sense of the torque associated with a given force.

Use the equation, duh.

b. Calculate the torque on a rigid body due to gravity.

Use the equation. The force acting on the thing would be its weight, right?

You should be able to analyze problems in statics (meaning that nothing is moving) so you can:

a. State the conditions for translational and rotational equilibrium of a rigid body.

Translational equilibrium occurs when the object is either at rest or moving with a constant velocity - the whole straight-line motion thing we studied to exhaustion. Rotational equilibrium takes place when an object is either at rest or rotating at a constant angular velocity.

b. Apply these conditions in analyzing the equilibrium of a rigid body under the combined influence of a number of coplanar forces applied at different locations.

Torque is pretty straightforward stuff. The main idea is that the sum of the torques (i.e., the net torque) acting on any object that is either at rest or rotating at a constant angular velocity must be zero.

There are three types of problems that one can expect to have to deal with. You got your basic teeter totter problem, the beam sticking out of the wall problem, and your ladder problems.