AP Physics – Torque – 34 /30

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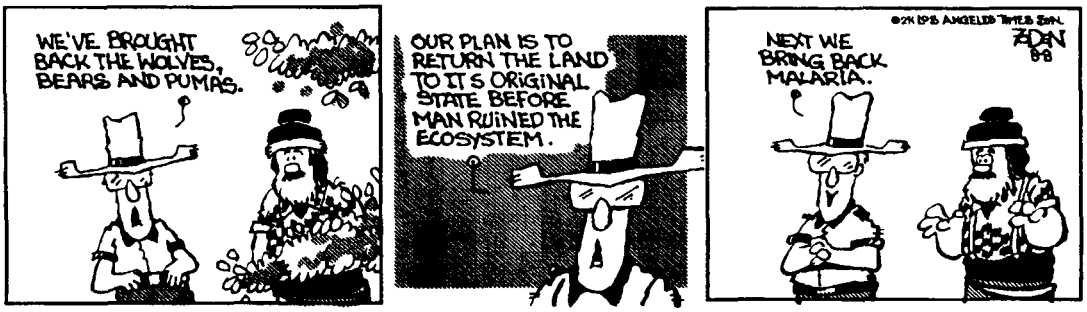

I have not failed. I've just found 10,000 ways that won't work.-- Thomas Edison

1. A uniform 12.0 m long ladder weighing 125 N rests against a smooth vertical wall. The bottom of the ladder makes an angle of 67.0° with the ground. A bucket of paint with a mass of 14.0 kg rests on a rung, 7.00 m up the ladder. What is the frictional force exerted on the bottom of the ladder?

2. A 158 kg monster runs up a hill that has a slope of 18.0° to the horizontal. The loathsome beast travels 1 550 m in 105 seconds. (a) How much work did the creature do on itself? (b) How much power did it develop?

3. A drum of chemical waste has a lid with a radius of 35.0 cm. To open the drum, a torque of 367 Nm is required. What force must you apply to the lid to open the drum?

4. A uniform 325 N beam that is 3.35 m in length sticks out from a vertical wall. A lightweight cable connects the end of the beam to the wall, making an angle of 60.0° between the beam and the cable. A 625 N worker stands on the beam a distance of 1.10 m from the wall. (a) What is the tension in the cable? (b) What is the force exerted on the beam by the wall?

5. Two little kiddies sit on a teeter totter. One kid has a mass of 15.2 kg and is 1.10 m from the point of balance. The other tot has a mass of 17.1 kg. How far away from the pivot is the second child?

6. You have traveled to the Sturgis IV system in your starship to check out their annual motor cycle festival. Harley, the fourth planet from the star, has a mass of 5.55×10^{25} kg. The mass of the star is 2.25×10^{30} kg. If the planet takes 395 days to go around the star one time, (a) what is the distance from it to the star, and (b) what is the orbital velocity of the planet?

7. What is the acceleration of gravity on Venus? Venus has a mass of 4.88×10^{24} kg and a radius of 6.07×10^{6} m.