1. After getting away with scheduling Dynamics at 9 AM, the university invites Alberto Gonzales to campus to unveil an expansion of its human rights violations, beginning with a version of “waterboarding” in which that watery slime mold from the men’s room by CEC is allowed to grow over the floorboards of the entire engineering complex.

An international observer \((M = 50 \text{ kg})\) runs at \(v = 10 \text{ m/s}\), jumps onto an inverted table \((m = 10 \text{ kg})\), and slides \(l = 25.5\text{ m}\) before coming to a stop. What is the coefficient of kinetic friction, \(\mu_k\), between the table and the slime?

2. In yet another atrocity, those completely rigid dinner rolls from the Malinckrodt café are mass-produced for distribution throughout campus, and launched at a rigid wall. Rolls are selected for hardness by discarding those with a coefficient of restitution less than 0.8. At what distance, \(l\) from the wall should the collection basket be placed?
3. A squirrel from the great rodent welfare state surrounding Graham Chapel protests Gonzales’ effrontery to Western mores. The squirrel pictured below is blocking a sidewalk by holding strings tied to two trees (θ = 30°), when the string in her left hand breaks. The mass, $M$, of squirrels by Graham Chapel is about 50 kg; the strings are of negligible mass.

(a) What is the acceleration of the squirrel immediately after the string breaks?

(b) By what fraction does the tension in the string in her right hand change immediately after the string breaks?

4. Gonzales’ career plan works out after all, and the world starts to revolve around him in gratitude for his service to humanity. To assess how this changes our lives, consider an individual in St. Louis ($d \approx 6,370,000$ m, $\phi = 38.63^\circ$) driving north in a vehicle whose speedometer indicates that he is driving at a constant speed, equal to the land speed record (143.1 m/s). Consider the center of the Earth to be a fixed point, and note that the Earth rotates once every day (86400 sec).

(a) What is the velocity of this person relative to a stationary observer at the center of the earth?

(b) What is the acceleration of this person relative to the stationary observer?