Physics, Preparation for Friday, Sept. 15

Copy and Read C6 of *Six Ideas*

As Problem Set #3, Turn In

pp. 67

1. C4R.4 The Zombies on the beam problem, which I have broken down into a multi-part problem — see below.

pp. 82-83

2. C5B.8
3. C5M.3
4. C5M.4

pp. 97-98

5. C6B.2
6. C6M.5

Working in Symbols and C4R.4 Broken Down

For ALL problems, work in symbols for as long as possible. Even if Moore gives you numbers, give names to the quantities. For example, if Moore says $m_{\text{Pluto}} = 1.8\, m_{\text{Chiron}}$ you could write down $m_{\text{Pluto}} = \rho\, m_{\text{Chiron}}$, where ρ (the Greek letter "rho") is equal to 1.8? When you arrive at a symbolic answer, then punch 1.8 into your calculator.

C4R.4 (a) m_{GG}, m_{ZA}, and m_{Beam} (GG for good guy, and ZA for zombie apocalypse) are the three masses. The beam has total length L, and $L - N$ of the beam extends towards the good guy from the fulcrum, while the remaining N of the beam extends toward the zombies from the fulcrum. Putting the origin of coordinates at the fulcrum with the positive x-axis extending along the beam toward the zombies, what are the three contributions to the center of mass of this system? Add them up. What must the three contributions add up to for the system's center of mass to be at the fulcrum? This equation can be solved for N, so it is no longer an unknown.

C4R.4 (b) The zombies walk an amount D_{ZA} from the end of their end of the beam. You compensate by walking an amount D_{GG} from your end of the beam. What are the three contributions to the center of mass of this system now? Add them up. They must still add up to zero, so that gives you an equation for D_{ZA}. You may or may not want to use the equation for N you found in (a) to simplify the equation for D_{ZA}.

C4R.4 (c) Now return to Moore's statement of the problem and plug in his numbers. Discover how far the zombies are from the fulcrum when you reach the fulcrum.