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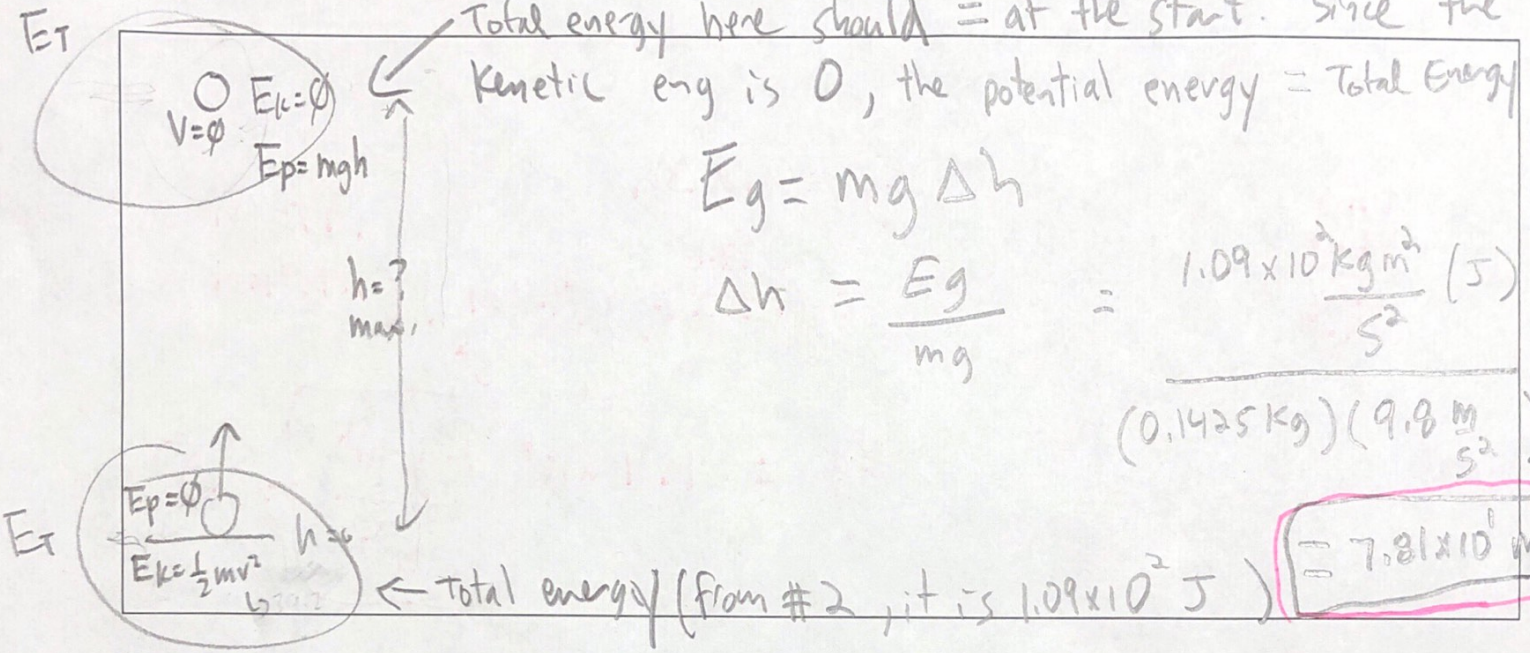
TOPIC 3.1	More Energy Equation Calculation Problems	BLM 3.1-11

3. If the baseball pitcher in question 2 throws the ball straight up, how high would it go before it slowed to a stop and started back down?



Total energy here should = at the start. Since the kinetic eng is 0, the potential energy = Total Energy

$E_g = mg\Delta h$

$\Delta h = \frac{E_g}{mg} = \frac{1.09 \times 10^2 \text{ kg m}^2/\text{s}^2 \text{ (J)}}{(0.1425 \text{ kg})(9.8 \text{ m/s}^2)}$

$= 7.81 \times 10^1 \text{ m}$

← Total energy (from #2, it is 1.09×10^2 J)

4. a) A loaded box car has a total mass of 6.80×10^4 kg. If the train is travelling at a speed of 23.7 m/s, what is the mechanical kinetic energy of the box car?
b) If a family car has a mass of 1237 kg, how fast would it have to go to have the same mechanical kinetic energy as the box car in part a)?

a) $E_K = \frac{1}{2}mv^2$

$= \left(\frac{1}{2}\right)(6.80 \times 10^4 \text{ kg})(23.7 \text{ m/s})(23.7 \text{ m/s})$

$= 1.91 \times 10^7 \left[\frac{\text{kg m}^2}{\text{s}^2}\right] \rightarrow \text{J}$

b) $v = \sqrt{\frac{2E_K}{m}}$

$v = \sqrt{\frac{2(1.91 \times 10^7)}{1237}}$

$v = 3.09 \times 10^4 \left[\frac{\text{kg m}^2}{\text{s}^2} \cdot \frac{1}{\text{kg}}\right] \frac{\text{m}}{\text{s}}$