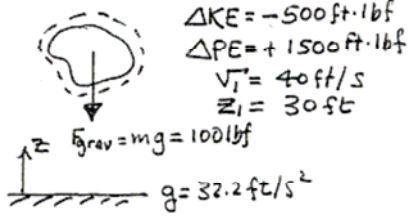


PROBLEM 2.3



(a)  $\Delta KE = \frac{1}{2} m [v_2^2 - v_1^2]$ ,  $m = \frac{F_{\text{grav}}}{g} = \frac{100 \text{ lbf}}{(32.2 \text{ ft/s}^2)} \left| \frac{32.2 \text{ lb}\cdot\text{ft/s}^2}{1 \text{ lbf}} \right| = 100 \text{ lb}$   
 Solving for  $v_2$ ,  
 $v_2 = \left[ \frac{2\Delta KE}{m} + v_1^2 \right]^{\frac{1}{2}} = \left[ \frac{2(-500 \text{ ft}\cdot\text{lbf})}{100 \text{ lb}} \left| \frac{32.2 \text{ lb}\cdot\text{ft/s}^2}{1 \text{ lbf}} \right| + (40 \frac{\text{ft}}{\text{s}})^2 \right]^{\frac{1}{2}}$   
 $= 35.75 \text{ ft/s}$

(b)  $\Delta PE = m g (z_2 - z_1) \Rightarrow 1500 \text{ ft}\cdot\text{lbf} = 100 \text{ lbf} (z_2 - 30 \text{ ft})$   
 $\uparrow F_{\text{grav}}$   
 Solving,  
 $z_2 = 45 \text{ ft}$