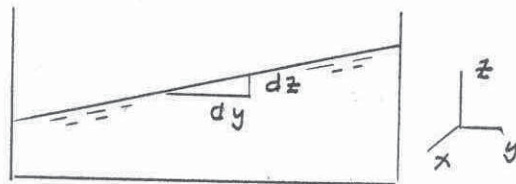2.151 An open container of oil rests on the flatbed of a truck that is traveling along a horizontal road at 55 mi/hr. As the truck slows uniformly to a complete stop in 5 s, what will be the slope of the oil surface during the period of constant deceleration?

$$slope = \frac{dz}{dy} = - \frac{a_y}{g + a_z} \qquad (Eg. 2.28)$$

$$a_y = \frac{final\ velocity - initial\ velocity}{time\ interval}$$

$$= \frac{0 - (55\ mph)(0.4470\ \frac{\frac{m}{s}}{mph})}{5\ s} = -4.92\ \frac{m}{s^2}$$

Thus,

$$\frac{dz}{dy} = - \frac{(-4.92\ \frac{m}{s^2})}{9.81\ \frac{m}{s^2} + 0} = \underline{\underline{0.502}}$$