SECOND MIDTERM

Name (print) Mark Reeve
Name (signed) Mark Reeve

Discussion Instructor (circle one): Baselgia  Morrill  Reeve  Stoops  Zhang
Discussion Section #

REPORT ALL NUMBERS TO THREE SIGNIFICANT FIGURES!
Use the conversion constants and data given on the front page.

(a) An object has a weight of 275 N on the moon. What is its weight on earth?
   \[ \frac{M_{\text{moon}}}{M_{\text{earth}}} = \frac{275 \text{ N}}{\text{moon}} \]
   \[ \frac{m_{\text{moon}}}{m_{\text{earth}}} = \frac{275 \text{ N}}{\text{moon}} \]
   \[ \text{(mg)moon} : (275N) \text{ moon} = (275N) \text{ moon} \]
   \[ \frac{1.61 \times 10^3 N}{\text{moon}} = \text{Weight}_\text{moon} \]

(b) An object has a mass of 343 kg on earth. What is its mass on the moon?
   Mass is invariant.
   \[ \frac{343 \text{ kg}}{\text{moon}} = \frac{343 \text{ kg}}{\text{moon}} \]

(c) When set in motion the block of mass 2.55 kg moves with constant velocity down the plane. If it is at rest on the plane, what is the frictional force acting on it?
   Note that the first sentence is entirely irrelevant to the second.
   The block is at rest.
   \[ f = mg\cos \theta = 14.33 \text{ N} \]

(d) A car goes around a curve whose radius is 305 ft at 55 mi/hr. What is its inward acceleration (in ft/s²)?
   \[ a_c = \frac{v^2}{r} = \frac{(55 \text{ mi/hr})^2}{(305 \text{ ft})} = 21.3 \text{ ft/sec}^2 = a_c \text{ outward} \]

(e) On another planet an object falls 150 m from rest and acquires a velocity of 3.25 m/s. What is g on this planet?
   \[ v^2 = v_0^2 + 2ay \]
   \[ a = \frac{v^2 - v_0^2}{2ay} \]
   \[ g = \frac{(3.25 \text{ m/s})^2}{2 \text{ (150 m)}} = 3.52 \times 10^2 \text{ m/sec}^2 = g \]