1. (2 pts) Two identical blocks of wood are held under water. The first is just beneath the surface of the water, while the second is held 2 feet down. Compared to the force on the first block, the force needed to hold the second in place is:
   a. greater  
   b. the same  
   c. smaller

2. (2 pts) Geoff is standing on a diving board. Which is true about the forces exerted on the diving board?
   a. \( F_A \) is down, \( F_B \) is up, \( F_A > F_B \)
   b. \( F_A \) is down, \( F_B \) is up, \( F_A < F_B \)
   c. Both forces are up, \( F_A > F_B \)
   d. Both forces are up, \( F_B > F_A \)

3. (6 pts) Determine the normal acceleration of a person standing on the equator of planet Earth.

4. (6 pts) A manometer is taken to Mars. The height of water in the tube is 0.044 inches. What is the atmospheric pressure on Mars? \( g_{\text{mars}} = 12.3 \text{ ft/s}^2 \)

5. (14 pts) Shane is pushing with a force of 95 lb to keep a 200 lb crate from tipping downward on a 50° incline as shown. Determine the minimum height \( h \) at which Shane can push without the crate tipping down the ramp. A separate, complete FBD is required for full credit.

6. (14 pts) A 13 lb beam is used to support a 36 lb sign as shown. The tension in the cable is 70 lbs. Determine \( h \), the height the cable is attached above the pin. A separate, complete FBD is required for full credit.
7. (14 pts) The weight limit on a 6 mm diameter nylon climbing rope is 1300 N. If the ultimate strength of nylon is 75 MPa, what is the factor of safety?

8. (14 pts) Mars has a radius of $3.4 \times 10^6$ m and mass of $6.42 \times 10^{23}$ kg. Marvin and his spaceship have an earth weight of 4200 N. What is their weight at 530 km above the surface of Mars?

9. (14 pts) A sample of ore hangs from a spring scale. In air, the spring scale measures 18 N. When the sample is submerged in water, the spring scale measures 11 N. What is the mass density of the ore sample?

10. (14 pts) A fire hose carries water from a hydrant to a height of 8m at a rate of 40L/s. The diameter of the hose at the hydrant is 0.065m and the water comes out of a 0.03m diameter nozzle. What is the gauge pressure at the hydrant?