More force practice 2

1. What is the mass of a 235 N acrobat? *(24.0 kg)*

2. A 25.6 kg rocket accelerates upward at 105 m/s^2. What is the thrust pushing it up? *(2940 N)*

3. The first law says that no force is required to maintain motion. Why do you have to keep pedaling your bicycle to keep it moving?

4. What is the difference between mass and weight?

5. Explain, in terms of Newton's laws, the magician's trick of pulling a tablecloth out from under a bunch of dishes and cups and stuff without disturbing them.

6. What net force is required to accelerate a 135,000 kg aircraft from rest to a speed of 35.0 m/s in 11.0 s? *(4.30×10^5 N)*

7. A crate rests on very low friction wheels. The crate and the wheels and stuff have a weight of 865 N. You pull on the rope with a force of 145 N.

    a. What is the acceleration of the system? *(1.64 m/s^2)*

    b. How far will it move in 2.00 s? *(3.28 m)*

8. A wise guy you know poses this problem to you, "A horse pulls on a cart, exerting a force on it. The cart exerts an equal and opposite force on the horse. So if the forces are equal, then the net force is zero and the horse cannot pull the cart." What is wrong about this set of particulars? [I.e., why can the horse pull the cart?]

9. The space shuttle has a mass of 2.0×10^6 kg. At lift off the engines generate an upward thrust of 1.3×10^8 N.
    a. What is the weight of the space shuttle? *(2.0×10^7 N)*

    b. What is the acceleration of the shuttle when it is launched? *($55\ m/s^2$)*

    c. The average acceleration of the shuttle during its 7.5 minute run is 18 m/s^2. What velocity does it theoretically achieve at the end of that time? *(8100 m/s)*

10. A 3.45 g hockey puck rests on a flat, smooth table. A horizontal net force of 85.0 N acts on it for 1.10 seconds.
    a. the acceleration of the puck, *($24\ 600\ m/s^2$)*

    b. the speed of the puck after the 1.10 s *(27 100 m/s)*

11. Two masses are connected by a light string that runs over a frictionless pulley as shown. What is the acceleration of the system when the masses are released and allowed to move? *($.334\ m/s^2$)*