Phys107 HW#02
Gladden

Solutions to Chapter 2 Exercises

1. The tendency of a rolling ball is to continue rolling in the absence of a force. The fact that it slows down is due to the force of friction.

4. He demolished the notion that a moving body requires a force to keep it moving. He showed a force is needed to *change* motion, not to keep a body moving, so long as friction was negligible.

6. Nothing keeps them moving. The Sun's force deflects their paths but is not needed to keep them moving.

13. Your body tends to remain at rest, in accord with Newton's first law. The back of the seat pushes you forward. If there is no support at the back of your head, your head is not pushed forward with your body, likely injuring your neck. Hence, headrests are recommended.

18. If there were no friction acting on the cart, it would continue in motion when you stop pushing. But friction does act, and the cart slows. This doesn't violate the law of inertia because an external force indeed acts.

22. The upward force is the tension in the vine. The downward force is that due to gravity. Both are equal when the monkey hangs in equilibrium.

27. From the equilibrium rule, $\Sigma F = 0$, the upward forces are 400 N + tension in the right scale. This sum must equal the downward forces 250 N + 300 N + 300 N. Arithmetic shows the reading on the right scale is 450 N.

30. You can say that no net force acts on a body at rest, but there may be any number of forces that act—that produce a zero net force. When the net force is zero, the body is in static equilibrium.

40. Friction on the cart has to be 200 N, opposite to your 200-N pull.

44. Two forces must be equal and opposite so that the net force = 0. Then the parachutist is in mechanical equilibrium.