

Homework Set #1 Solutions (9/2-5):

Chapter 2: **Questions** 31, 38, 49 **Exercises** 5, 9, 21

Questions:

31. The bicycle undergoes the greatest change in velocity in the same time interval and therefore has the greatest acceleration.
38. The ball slows down by 10 meters per second every second. In two seconds it slows down by 20 meters per second and is traveling at 10 meters per second.
49. Because of the marble's greater weight, air-resistance will affect it less than the ping-pong ball allowing it to speed up faster. Therefore the marble has the greater acceleration.

Exercises:

5.
$$\bar{s} = \frac{d}{t} = \frac{143 \text{ miles}}{24h} = 5.96 \text{ mph}$$
9.
$$\bar{s} = \frac{d_1 + d_2}{t} = \frac{(4 \text{ mph})(3h) + 0}{5h} = 2.4 \text{ mph}$$
21.
$$d = \frac{1}{2}at^2 = \frac{1}{2}(10 \text{ m/s}^2)(2s)^2 = 20 \text{ m}$$

Chapter 3: **Questions** 4, 7 **Exercises** 1, 8

Questions:

4. There must be an unbalanced force opposing its motion. We conclude that the surface exerts a frictional force on the book.
7. Because of its inertia. When the car accelerates backward, the tassel tends to remain at its original speed.

Exercises:

1. a) $8 \text{ N} + 6 \text{ N} = 14 \text{ N}$
b) $8 \text{ N} - 6 \text{ N} = 2 \text{ N}$
c) $\sqrt{(8 \text{ N})^2 + (6 \text{ N})^2} = 10 \text{ N}$ or use a scale drawing

8.
$$a = \frac{F_{net}}{m} = \frac{6000N}{60,000kg} = 0.1m/s^2$$