Name_____

Phys 2010 (NSCC), Fall 2005
Problem Set #2

1. A motorist drives north for 35.0 minutes at 85.0 km/hr and then stops for 15.0 minutes. He then continues north, traveling 130 km in 2.00 hr. (a) What is his total displacement? (b) What is his average velocity?

2. If the average speed of an orbiting space shuttle is 19800 $\frac{\text{mi}}{\text{hr}}$, determine the time required for it to circle the Earth. Assume that the radius of the shuttle's orbit is 4163 mi. (This is the radius for an orbit at 200 mi above the Earth's surface.)

3. A car traveling in a straight line has a velocity of $+5.0\,\frac{\text{m}}{\text{s}}$ at some instant. After 4.0 s, its velocity is $+8.0\,\frac{\text{m}}{\text{s}}$. What is the car's average acceleration during the 4.0−s time interval?

4. A runner accelerates to a velocity of $5.36\,\frac{\text{m}}{\text{s}}$ due west in 3.00 s. His average acceleration is $0.640\,\frac{\text{m}}{\text{s}^2}$, also directed due west. What was his velocity when he began accelerating?

5. In getting ready to slam-dunk the ball, a basketball player starts from rest and sprints to a speed of $6.0\,\frac{\text{m}}{\text{s}}$ in 1.5 s. Assuming that the player accelerates uniformly, determine the distance he runs.

6. A speedboat increases its speed uniformly from $20\,\frac{\text{m}}{\text{s}}$ to $30\,\frac{\text{m}}{\text{s}}$ in a distance of 200 m. Find (a) the magnitude of its acceleration and (b) the time it takes the boat to travel the 200−m distance.

7. A train is travelling down a straight track at $20\,\frac{\mathrm{m}}{\mathrm{s}}$ when the engineer appplies the brakes, resulting in an acceleration of $-1.0\,\frac{\mathrm{m}}{\mathrm{s}^2}$ as long as the train is in motion. How far does the train move in the time that it takes to come to a halt?

8. From her bedroom window a girl drops a water–filled balloon to the ground, 6.0 m below. If the balloon is released from rest, how long is it in the air?