Speed and Velocity Problems

1. If a car moves with an average speed of 60.0 km/hr for an hour, it will travel a distance of 60.0 km. How far will it travel if it continues this average rate for 4.00 hrs?

2. A motorist travels 406 km during a 7.00 hr period. What was the average speed in km/hr and m/s? Answers: 58.0 km/hr, 16.1 m/s.

3. A bullet is shot from a rifle with a speed of 720. m/s. What time is required for the bullet to strike a target 3240 m away? Answer: 4.50 s.

4. Light from the sun reaches the earth in 8.30 minutes. The speed of light is 3.00×10^8 m/s. In kilometers, how far is the earth from the sun?   Answer: 1.49×10^8 km.

5. The peregrine falcon is the world's fastest known bird and has been clocked diving downward toward its prey at constant vertical velocity of 97.2 m/s. If the falcon dives straight down from a height of 100. m, how much time does this give a rabbit below to consider his next move as the falcon begins his descent?

6. Hans stands at the rim of the Grand Canyon and yodels down to the bottom. He hears his yodel back from the canyon floor 5.20 s later. Assume that the speed of sound in air is 340.0 m/s. How deep is the canyon?

7. For a long time it was the dream of many runners to break the "4-minute mile." Now quite a few runners have achieved what once seemed an impossible goal. On July 2, 1988, Steve Cram of Great Britain ran a mile in 3.81 min. During this amazing run, what was Steve Cram's average speed in:

    a. mi/min?

    b. mi/hr?

8. It is now 10:29 a.m., but when the bell rings at 10:30 a.m. Suzette will be late for French class for the third time this week. She must get from one side of the school to the other by hurrying down three different hallways. She runs down the first hallway, a distance of 35.0 m, at a speed of 3.50 m/s. The second hallway is filled with students, and she covers its 48.0 m length at an average speed of 1.20 m/s. The final hallway is empty, and Suzette sprints its 60.0 m length at a speed of 5.00 m/s. Does Suzette make it to class on time or does she get detention for being late again?

9. During an Apollo moon landing, reflecting panels were placed on the moon. This allowed earth-based astronomers to shoot laser beams at the moon's surface to determine its distance. The reflected laser beam was observed 2.52 s after the laser pulse was sent. The speed of light is 3.0×10^8 m/s. What was the distance between the astronomers and the moon?

10. Two physics professors challenge each other to a 100. m race across the football field. The loser will grade the winner's physics labs for one month. Dr. Rice runs the race in 10.40 s. Dr. De La Paz runs the first 25.0 m with an average speed of 10.0 m/s, the next 50.0 m with an average speed of 9.50 m/s, and the last 25.0 m with an average speed of 11.1 m/s. Who gets stuck grading physics labs for the next month?