Chapter 1, Exercises and Problems

1.19.   Solve: A forgetful physics professor goes for a walk on a straight country road. Walking at a constant speed, he covers a distance of 300 m in 300 s. He then stops and watches the sunset for 100 s. Finding that it was getting dark, he walks faster back to his house covering the same distance in 200 s.

1.20.   Solve: Forty miles into a car trip north from his home in El Dorado, an absent-minded English professor stopped at a rest area one Saturday. After staying there for one hour, he headed back home thinking that he was supposed to go on this trip on Sunday. Absent-mindedly he missed his exit and stopped after one hour of driving at another rest area 20 miles south of El Dorado. After waiting there for one hour, he drove back very slowly, confused and tired as he was, and reached El Dorado in two hours.

1.44.   Solve: Rahul was coasting on interstate highway I-35 from Wichita to Kansas City at 65 mph. Seeing an accident at a distance of 200 feet in front of him, he braked his car to a stop with steady deceleration.

1.45.   Solve: A car starts coasting at an initial speed of 30.0 m/s up a 10° incline. 230 m up the incline the road levels out to a flat road and the car continues coasting at a reduced speed along the road.

1.46.   Solve: A skier starts from rest down a 25° slope with very little friction. At the bottom of the 100 m slope the skier moves to a flat area and continues at constant velocity.

1.47.   Solve: A ball is dropped from a height to check its rebound properties. It rebounds to 80% of its original height.

1.48.   Solve: Two boards lean against each other at equal angles to the vertical direction. A ball rolls up the incline, over the peak, and down the other side.

1.56.   Solve: Susan enters a classroom, sees a seat 40 m directly ahead, and begins walking toward it at a constant leisurely pace, covering the first 10 m in 10 seconds. But then Susan notices that Ella is heading toward the same seat, so Susan walks more quickly to cover the remaining 30 m in another 20 seconds, beating Ella to the seat. Susan stands next to the seat for 10 seconds to remove her backpack.

1.57.   Solve: A crane operator holds a ton of bricks 30 m above the ground. Four seconds after he is told to lower the bricks, he takes four seconds to lower them 15 m at a constant rate before stopping the bricks to make an eight-second safety check. He then continues lowering the bricks the remaining 15 m, taking four more seconds.