Physics 107 HOMEWORK ASSIGNMENT #2

Cutnell & Johnson, 7th edition

Chapter 1: Problem 50

Chapter 2: Problems 44, 54, 56

Chapter 3: Problem 38

*50 Multiple-Concept Example 9 deals with the concepts that are important in this problem. A grasshopper makes four jumps. The displacement vectors are (1) 27.0 cm, due west; (2) 23.0 cm, 35.0° south of west; (3) 28.0 cm, 55.0° south of east; and (4) 35.0 cm, 63.0° north of east. Find the magnitude and direction of the resultant displacement. Express the direction with respect to due west.

44 Multiple-Concept Example 6 reviews the concepts that play a role in this problem. A diver springs upward with an initial speed of 1.8 m/s from a 3.0-m board. (a) Find the velocity with which he strikes the water. [Hint: When the diver reaches the water, his displacement is \( y = -3.0 \) m (measured from the board), assuming that the downward direction is chosen as the negative direction.] (b) What is the highest point he reaches above the water?

*54 A ball is thrown upward from the top of a 25.0-m-tall building. The ball’s initial speed is 12.0 m/s. At the same instant, a person is running on the ground at a distance of 31.0 m from the building. What must be the average speed of the person if he is to catch the ball at the bottom of the building?

**56 While standing on a bridge 15.0 m above the ground, you drop a stone from rest. When the stone has fallen 3.20 m, you throw a second stone straight down. What initial velocity must you give the second stone if they are both to reach the ground at the same instant? Take the downward direction to be the negative direction.

*38 Multiple-Concept Example 4 deals with a situation similar to that presented here. A marble is thrown horizontally with a speed of 15 m/s from the top of a building. When it strikes the ground, the marble has a velocity that makes an angle of 65° with the horizontal. From what height above the ground was the marble thrown?