Extra Practice Problems for Chapter 5

1. A hiker travels with a velocity of 1.9 m/s at 117° for 12.0 min. She then turns and walks with a velocity of 1.7 m/s at 193° for 10.7 min. What is her final displacement?

2. A ship's engine gives it a constant velocity of 21 km/hr at 58°, while the current has a constant velocity of 3.2 km/hr at 251°. If these conditions prevail for 117 minutes, what will be the ship's displacement?

3. A projectile is fired with a velocity of 213 m/s at 32°. If it lands at the same height from which it is released, what are the final x- and y-components of its velocity?

4. Describe how air resistance would affect the answers you gave in the problem above.

5. A projectile is fired with a velocity of 54 m/s at 77°. What is its maximum height? How long does it take to reach that height? How long would it take to return to the height from which it was launched?

6. What is the range of a projectile that is fired with a velocity of 271 m/s at 49°? Assume it stops when it reaches the height from which it was fired.

7. A sharpshooter wants to hit a target that is 155 m away and at the same level as his rifle. At what angle should he aim if his rifle fires its bullets with a speed of 790 m/s?

8. A pitcher throws a baseball with a velocity of 37 m/s at 75°. It ends up getting stuck in a tree branch that is 5.2 m away from the pitcher horizontally. What is the height of that branch relative to the height from which the ball was thrown?

9. A sniper shoots a bullet horizontally with a speed of 750 m/s. If the target is at a horizontal distance of 250 m, how far will the bullet drop by the time it hits the target?

10. A pistol is aimed horizontally and fired. The bullet's speed is 110 m/s. It drops 17.0 cm before it hits the target. What is the horizontal distance to the target?