Name _____ Date _____ Period _____

Worksheet: Equation Review
C H A P T E R   5 :   P R O J E C T I L E   M O T I O N

Directions: *Answer the following questions based on reading from Chapter 3 (pgs. 68-85) and/or from notes in class.*

EQUATIONS:

$$v = v_0 + at \qquad d = \frac{1}{2}at^2 \qquad R = \sqrt{A^2 + B^2}$$

$$v = v_0 + gt \qquad d = \frac{1}{2}gt^2 \qquad t = \sqrt{\frac{2d}{g}}$$

QUESTIONS:

1. How does a vector quantity differ from a scalar quantity?

2. How does the downward component of the motion of a projectile compare with the motion of a free fall?

3. What do we call a projectile that continually "falls" around the Earth?

4. Calculate the resultant velocity of an airplane that normally flies at 200 km/hr if it encounters a 50 km/hr tailwind. If it encounters a 50 km/hr headwind.

5. Calculate the resulting speed of an airplane with an airspeed of 120 km/hr pointing due North when it encounters a wind of 90 km/hr directed from the west. (HINT: use Pythagorean theorem)

6. A bird flies at a speed of 10 m/s in still air.

a. If he flies into a 2 m/s headwind, how fast will he be traveling relative to the ground?

b. Relative to the ground below, how fast will he travel when he experiences a 2 m/s tailwind?

c. While flying at 10 m/s, suppose that he encounters a 10m/s cross wind (coming at right angle to his heading). What is his speed relative to the ground below?

7. A boat is rowed at 8 km/hr directly across a river that flows at 6 km/hr.

a. What is the resultant speed of the boat?

b. How fast and in what direction can the boat be rowed to reach a destination directly across the river?

8. Harry and Angela look from their balcony to a swimming pool below that is 15 m from the bottom of their building. They estimate the balcony is 45 m high and wonder how fast they would have to jump horizontally to succeed in reaching the pool. What is your answer?

9. Harry accidentally falls out of a helicopter that is traveling at 15 m/s. He plunges into a swimming pool 2 seconds later. Assuming no air resistance, what was the horizontal distance between Harry and the swimming pool when he fell from the helicopter?

10. A bowling ball is moving at 10 m/s when it rolls off the edge of a tall building. What is the ball's speed one second later? (Hint: Think vectors)