Name: _____Key_____

Notes - 3.1. Kinematics in Two Dimensions: An Introduction

1. Give three examples of 2-dimensional motion.
   A. _Arc of a basketball_
   B. _Orbit of a satellite_
   C. _Bicycle rounding a curve_

2. Given a right triangle of sides a and b and a hypotenuse of c, write the equation to find the length of c. $c = \sqrt{a^2 + b^2}$

3. What is used to represent the magnitude and direction of a vector? _An arrow_

4. The length of the vector is directly proportional to the _magnitude_ of the vector.

5. HUGE IDEA: The horizontal and vertical components of two-dimensional motion are _independent_ of each other. Any motion in the horizontal direction does not affect motion in the vertical direction, and vice versa.

6. One baseball is dropped from rest. At the same instant, another is thrown horizontally from the same height and follows a curved path. Which baseball hits the ground first? _They both hit the ground at the same time._

7. For the thrown (blue) ball in Figure 3.6,
   A. Is there acceleration in the y-direction? _Yes, a = g_

   B. Is there acceleration in the x-direction? _No_

8. The key to analyzing such motion, called projectile motion, is to resolve (break) it into motions along perpendicular directions. Resolving two-dimensional motion into _perpendicular_ components is possible because the components are _independent_.