Date ___

Name <u>Answer Key</u> Honors Physics Period _____

Vectors/Projectiles WS #9H Mrs. Nadworny

Projectiles Challenge Question

Directions: Solve the following problems using the GUESS method. Show ALL work neatly using proper units and significant figures.

- 1. A basketball is thrown from a height of 1.85 meters with an initial speed of 15.7 meters per second at an angle of 50.0 degrees. It misses the basket and lands on the floor.
 - a. Calculate the flight time of the basketball.

 $v_{ix} = v_i \cos \theta = (15.7 \frac{m}{s})(\cos 50.0^\circ) = 10.1 \frac{m}{s}$ $v_{iy} = v_i \sin \theta = (15.7 \frac{m}{s})(\sin 50.0^\circ) = 12.0 \frac{m}{s}$

$$d = v_{i}t + \frac{1}{2}at^{2}$$

$$-1.85m = (12.0\frac{m}{s})t + \frac{1}{2}(-9.81\frac{m}{s^{2}})(t^{2})$$
Quadratic Equation!
$$4.9t^{2} - 12t - 1.85 = 0$$

$$t = \frac{-(-12) \pm \sqrt{(-12)^{2} - 4(4.9)(-1.85)}}{2(4.9)}$$

$$t = 2.59s \text{ and } -0.146s$$

b. Calculate the horizontal distance traveled by the ball.

$$d = v_i t + \frac{1}{2} a t^2$$

$$d = (10.1 \frac{m}{s})(2.59s)$$

$$d = 26.2m$$

Answers in size order: 2.59, 26.2