Name _____Answer Key_____ Date _____

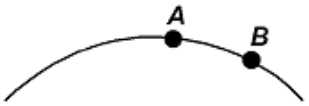
Honors Physics Kinematics WS #9H

Period _____ Mrs. Nadworny

Throwing Upwards

Directions: Solve the following problems using the GUESS method. Show all work clearly

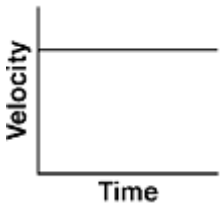
1. The diagram below represents the path of an object after it was thrown.

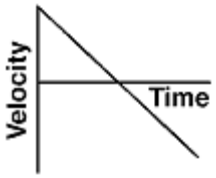


What happens to the object's acceleration as it travels from A to B? [Neglect friction]

(A) increases (B) decreases (C) remains the same

2. Which of the following graphs best represents the relationship between the velocity of an object thrown straight upward from the surface of Earth and the time that elapses while it is in the air?

(A) 

(B) 

(C) 

(D) 

3. You throw a baseball straight up and it returns to your hand in 1.46 seconds.

   a. Calculate the initial speed of the ball.

$$v_i = v_f - at$$
$$= -(-9.81\,\tfrac{m}{s^2})(0.730s)$$
$$= 7.16\,\tfrac{m}{s}$$

   b. Calculate the height that the ball reaches.

$$d = v_i t + \tfrac{1}{2}at^2$$
$$= (7.16\,\tfrac{m}{s})(.730s) + \tfrac{1}{2}(-9.81\,\tfrac{m}{s^2})(.730s)^2$$
$$= 2.61m$$

4. A tennis ball is struck with a racket, firing it straight upward at 19 m/s. After how much time will it be falling at 14 m/s? [Hint: How do we show direction changes?]

$$t = \frac{v_f - v_i}{a} = \frac{-14\,\tfrac{m}{s} - 19\,\tfrac{m}{s}}{-9.81\,\tfrac{m}{s^2}} = 3.4\ s$$

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5. An arrow is fired straight up, leaving the bow at 16.7 m/s. If air resistance is negligible, how high will the arrow rise?

$$d = \frac{v_f^2 - v_i^2}{2a} = \frac{0 - (16.7\,\frac{m}{s})^2}{2(-9.81\,\frac{m}{s^2})} = 14.2\text{ m}$$

6. A man named Bungkas climbed a palm tree in 1970 and built himself a nest there. In 1994 he was still up there, and he had not left the tree for 24 years. Suppose Bungkas asks a villager for a newspaper, which is thrown to him straight up with an initial speed of 11.5 m/s. When Bungkas catches the newspaper from his nest, its velocity is 3.5 m/s straight up. From this information, find the height at which the nest was built. Assume that the newspaper is thrown from a height of 1.5 m above the ground. [Hint: When you solve for distance, it's the distance traveled by the newspaper, not the true height of the nest.]

$$d = \frac{v_f^2 - v_i^2}{2a} = \frac{(3.5\,\frac{m}{s})^2 - (11.5\,\frac{m}{s})^2}{2(-9.81\,\frac{m}{s^2})} = 6.1m$$

$$Height = 6.1 + 1.5m = 7.6m$$

Answers in size order: 2.61, 3.4, 7.16, 7.6, 14.2