

Name: _____ Block: _____ Date: _____

Physics I, Ch. 3 – Practice and Review problems

Show all work on the following problems. For each problem - remember to draw a vector diagram, write a formula, show work, and find the correct answer with correct units and significant figures.

1. While following the directions on a treasure map, a pirate walks 65.0 m north, then turns and walks 30.5 m east. What single straight-line displacement could the pirate have taken to reach the treasure? Solve this mathematically but still draw a diagram.

2. A diver running at 3.6 m/s dives out horizontally from the edge of a cliff and reaches the water below 2.5 s later.

- How high was the cliff?

- How far from the base of the cliff did the diver hit the water?

3. A ball player wishes to determine her pitching speed by throwing a ball **horizontally** from an elevation of 4.0 m above the ground. She sees the ball land 25.0 m down range.

- Draw a diagram of the situation indicating distances and the path of the ball.

- Calculate the speed of the ball as it leaves her hand.

4. Tiger Woods hits a golf ball with a velocity of 38 m/s at a 40° angle. Assume the fairway is level and the ball travels straight. Neglect air resistance.

a. Draw a vector diagram and determine the x and y components of the initial velocity.

b. Calculate the maximum height the ball reaches in its path.

c. Determine how long the golf ball is in the air.

d. Calculate the displacement of the golf ball.

5. Suppose you are the “prop” person for a western movie and you need to place the watering trough at the perfect place to catch the bad guy as he falls after being pushed out the saloon window by the sheriff. The bad guy’s initial velocity is all horizontal at 3.5 m/s and the window is 6.5 m above the ground. How far away from the building should you put the trough? (hint: this is just like the targeting lab with the ramp and the cup)

6. If you were use a slingshot to shoot a banana to a monkey hanging from the bookshelf across a room, should you aim directly at the monkey, above it or below it in order to hit it? Explain your answer.

7. What if the monkey (see #6) let go of the shelf and dropped at the exact second that you fired? Should you aim the banana directly at the monkey, above it, or below it in order to hit it? Explain your answer.

8. If you have two vectors that each have a magnitude of 5 m and one is pointing East and the other is pointing West, their resultant's magnitude would be:

- a. 25 m b. 15 m c. 10 m d. 5 m e. 0 m

9. Two vectors acting at right angles to each other and having magnitudes of 6 and 8 have a resultant with a magnitude of

- a. 2 b. 10 c. 14 d. 48 e. 100

10. Two vectors having magnitudes of 5 and 8 *cannot* have a resultant with a magnitude of:

- a. 3 b. 7 c. 13 d. 15 e. all of the above are possible

11. If you shoot a rock downward from a slingshot and drop one from the same height at the same time, which will hit the ground first?

How would this be different if the first rock was shot exactly horizontally when the other rock was dropped?

Why are those two scenarios different?