

Name:

Physics 12 Assignment 3: 2D Kinematics

Answers must be circled, and have correct significant figures, units, and direction (where appropriate). Show All Work!

1. The space Shuttle used to land at an angle of depression of 19.0° at 101m/s
 - a. What was the space shuttle's ground speed on descent? (horizontal velocity)
 - b. What was the space shuttle's rate of descent? (vertical velocity)
2. Mission control lead engineer John "Johnny" Johnson is so excited about the landing that he starts running around waving his hands in the air. He runs 22m N, then 13m E, then 4.0m S. What is his overall displacement?
3. Oh dear! The space shuttle has encountered a cross-wind! The shuttle first zigs at 104m/s 11.2° NoE for 22s , then zags 98.5m/s 4.7° SoE for 18s .
 - a. What was the shuttle's total displacement?
 - b. What was the shuttle's average velocity over the entire interval?
4. Mission Commander Furd Gurfison Realizes that he's not going to make it!! At the last possible moment he hits the eject button and is launched from the shuttle at 38m/s with an angle of elevation of 68.1° (keep in mind that the shuttle was already descending at 101m/s 19.0° depression).
 - a. What is Furd's velocity with respect to the ground when he ejects? (*total velocity, not just horizontal*)
 - b. The shuttle was 135m above the ground when Cmdr Gurfison ejected. What is the maximum height he attains?
5. Intrepid space explorer Furd Gurfison lands in the inhospitable Florida Foreverglades! After quickly subduing a nearby alligator with his bare hands he begins to plan his escape. His first course of action is to launch a signal flare at 295m/s 55.0° elevation. Unfortunately the flare lands on the only nearby rescue boat, the USS Funderbolt and promptly destroys it to pieces!
 - a. How high does the signal flare fly?
 - b. How far from Furd was the USS Funderbolt? (Horizontally)
6. Rescue team leader Blastifer Jones is on the lookout for Commander Furd, but the dense foliage is obstructing her view. She activates her rocket boots which give her a velocity of 97.3m/s . If she manages to reach a maximum height of 311m what was her angle of elevation at launch?