

**Physics 10154 - Quiz #3B**

**Please clearly indicate (with a box) your answers to the following problems. SHOW ALL WORK. If I cannot see how you arrived at an answer to a problem, you will lose points.**

**1. (40 pts)** An airplane travels 233 miles in a direction  $15.0^\circ$  North of West, then 122 miles due South, then 145 miles in a direction  $34.5^\circ$  South of East. What is the magnitude and direction of the resultant displacement?

2. (60 pts) A model rocket starts at rest and accelerates up a 2.50 meter ramp (angled  $65.0^\circ$  above the horizontal) with an acceleration of  $145 \text{ m/s}^2$ . After it leaves the launching ramp, the rocket is in free-fall.

a) Starting from the moment it leaves the end of the ramp, how long is the rocket in the air? You can assume that "ground level" is at the bottom of the ramp.

b) What is the magnitude and direction of the rocket's velocity the instant before it hits the ground?