

Physics 303K Worksheet 3

1. Name (Write legibly! If I can't read your name, you don't get credit for attending.):

2. **Sling swinging: Rotational Motion and Hanging Forces:**

I am swinging a ball on a string around in a circle horizontally. The ball of mass m is travelling at speed v m/s on a string that is r meters long. What angle does the string make with the horizontal plane?

3. **Cancun adventure: Projectile Motion and Relative Motion:**

Over Spring Break, you take a trip to Cancun. You are riding a longboard to the beach. You are travelling north at 5 m/s. As you begin to cross a 10m wide lagoon bridge, you toss your empty bottle horizontally over the side of the bridge. You see the bottle flying away from you west at 3 m/s. It is 5 m to the water. Just as the bottle leaves your hand, a police boat emerges from under the bridge. The boat is 1.5 m long and 1m wide. The boat is travelling west at 5 m/s. Will your bottle hit the boat? Will you spend the rest of your vacation in prison?