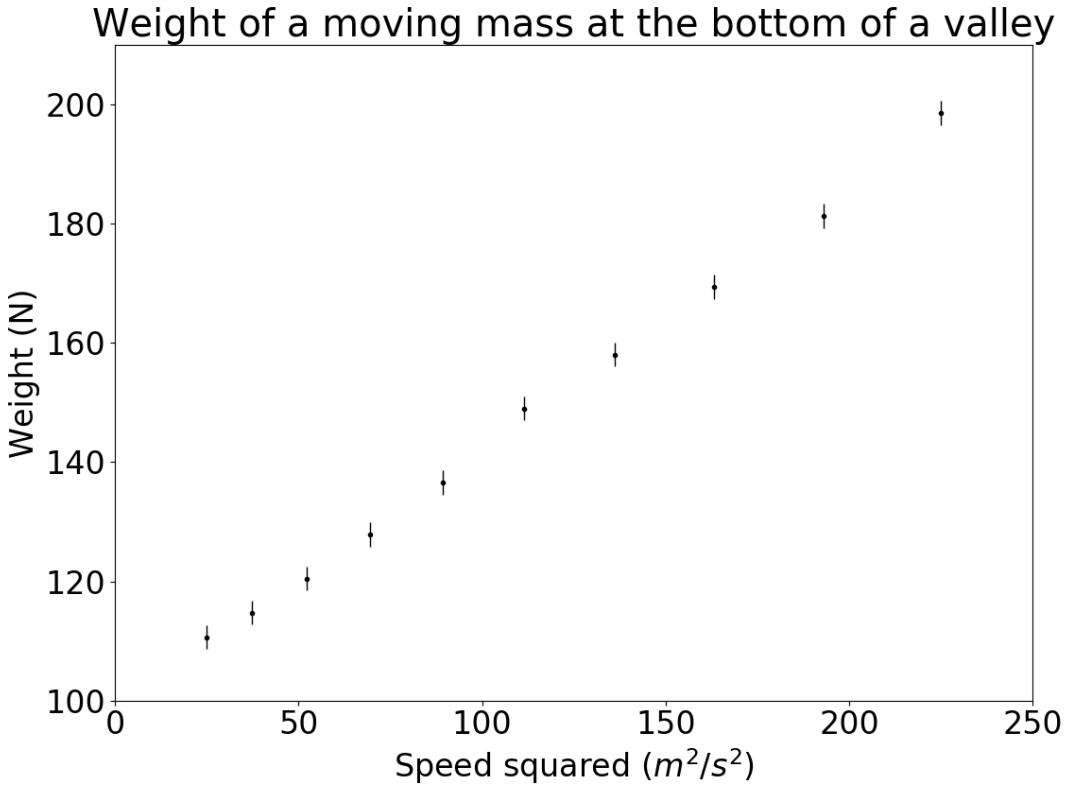
PHY151 Practical Questions for Oct 17 to 21

1. A string is attached to two rubber balls, and passes through a straw in the middle. One end of the string hangs down and is connected to the heavier ball. The other end is set spinning in a horizontal circle of radius 1 m by someone holding the straw. How many rotations per second must the moving rubber ball make in order that the hanging rubber ball not move up or down? The heavier ball has twice the mass of the lighter ball. Note that the string attached to the lighter ball is NOT horizontal.

2. Modelling question: A person stands on top of a 50-m-tall building on a day with no wind. What is the farthest horizontal distance they can throw a 60-g tennis ball? Do not ignore air resistance.

3. Data Analysis question: A road has goes down and up again, forming a valley at the bottom. You're trying to find the radius of curvature of the bottom of the valley. You put a bathroom scale on a skateboard, and put a mass on the bathroom scale. When at rest on a level surface, the scale reads 100 N. Then you record what the scale says at the bottom of the hill when the skateboard is moving at different speeds. Your data is plotted below. What is the radius of curvature at the bottom of the valley?



4. What is the shape of the surface of the water in a rotating bucket? Assume that the water is in equilibrium, so it's rotating like a solid object (with the same

angular speed as the bucket). Note: at the air-water boundary (the surface of the water), the force of the water acts perpendicularly to the surface exactly like a normal force does.