**Vertical Circle Problems:** Name

1. A physics teacher twirls a roll of masking tape in a 2.2 m radius vertical circle. What is the minimum velocity at the top of the circle that will keep the string from going slack? (4.6 m/s)
2. A rider moving in a 5.1 m radius vertical circle feels 4.5 “g”s at the bottom of the circle. A) How many “g”s is the ride pulling? B) How many “g”s do they feel at the top? (3.5 “g”s, 2.5 “g”s)
3. A 2.00 kg object moves in a 4.25 m radius vertical circle with a period of 3.00 seconds. Find the force needed at the top, and at the bottom. (17.7 N Down, 56.9 N up)
4. A 7.0 kg mass moves at a uniform speed of 5.0 m/s in a 4.0 m radius circle on the end of a rod. What force is needed at the top and at the bottom? (25 N up, 110 N up)
5. A 2.72 kg mass moves at a uniform speed in a 1.95 m radius circle on the end of a rod. At the top, the rod is exerting a downward force of 4.01 N on the mass. a) What is the centripetal acceleration of the mass? b) What is its period? c) What force does the rod exert at the bottom? (11.3 m/s/s, 2.61 s, 57.4 N up)
6. An 11.5 kg mass moves at a uniform speed in a 1.43 m radius circle on the end of a rod. At the bottom, the rod is exerting an upward force of 156 N on the mass. a) What is the centripetal acceleration of the mass? b) What is its speed? c) What force does the rod exert at the top? (3.76 m/s/s, 2.32 m/s, 69.6 N up)