

Centripetal Force PreLab

Name: _____ **Lab Section:** _____

Date: _____

PreLab Activity (10 points) – Complete prior to your lab session & hand in at the START of lab.

1. You are swinging a ball attached to a string (length is 0.8m) horizontally over your head outside a student dorm at NIU.
 - a. What provides the “center-seeking” force that keeps the ball moving in a circle?
 - b. If the ball makes 2 complete revolutions per second, what is the angular velocity of the ball?
 - c. Using the relationship between angular velocity and the tangential velocity, calculate the tangential velocity of the ball.

d. Draw free body diagrams *for the ball* from viewpoints looking from above (use a *polar coordinate system*) and looking from the side (use a *Cartesian coordinate system* where the radial direction is one of the axes).

e. Explain why it is ***impossible*** to swing a ball such that *both the ball and the string lie in a perfect horizontal plane* (if necessary, make appropriate modifications to your free body diagrams above to illustrate how you are able to swing a *ball in a perfect horizontal plane*).

End of Prelab – TURN IN THIS PAGE WITH YOUR ANSWERS TO THE QUESTIONS AT THE START OF THE LAB SESSION