Name______________________________________

Date__________ **Pd**____

Central Net Force Particle Model:

Circular Motion Problem Solving

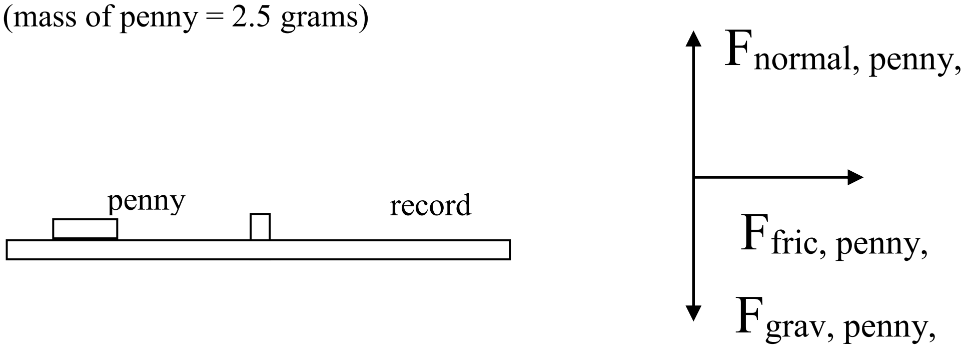
When we did Newton's 2nd law, we established: sum of forces = net force = ma

Now, for circular motion: sum of radial forces = centripetal force = $\frac{mv^2}{r}$

Note that "Centripetal force" is just a fancy name for the net force. It is not a kind of interaction (like gravity or normal forces) and is NOT drawn on force diagrams.

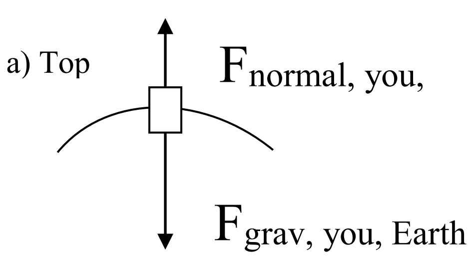
EXAMPLES:

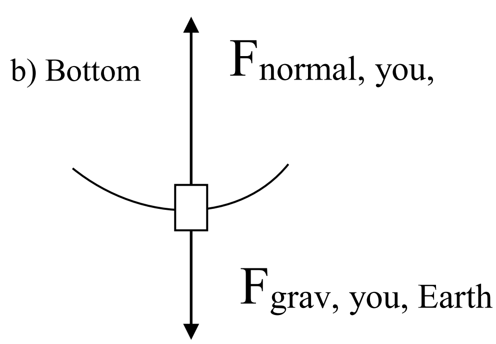
1. What frictional force is needed to keep a penny from sliding off a record rotating at 33 ¹/₃ revolutions per minute when it is placed 10 cm from the center of the record. (mass of penny = 2.5 grams)



Net radial force = $F_{fric} = (mv^2)/r = [(0.0025kg)(2\pi\ 0.1\ m /1.8\ sec)^2] / 0.1\ m$

2. A ferris wheel with a 20 m radius and tangential speed of 4 m/s has all 70 kg of you riding it. How big is the normal force exerted on you at **a**) the top **b**) the bottom?





$F_g - F_N = (mv^2)/r$ $\qquad$ $F_N - F_g = (mv^2)/r$

$F_N = F_g - (mv^2)/r$ $\qquad$ $F_N = F_g + (mv^2)/r$