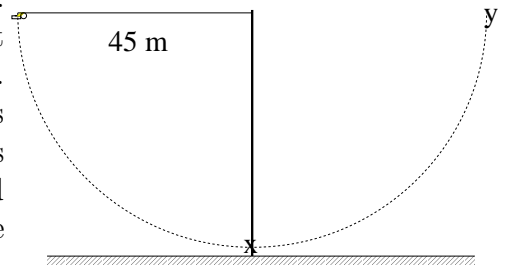


Quiz 3	DL Sec	Grading:	
Last 6 digits of student ID:		Name:	First three letters of your family name

1. At the California state fair there is a “human pendulum” ride. Fei decides she is going to ride it. She is released from rest from the position shown, attached to a 45 metre long rope. The other end of the rope is attached to a pole, so Fei travels in a circular arc. The next series of questions ask about Fei’s trip on the pendulum. Her mass is 55 kg, and you should ignore air resistance and friction for this problem. (On the real ride, these are important!)



- (a) Draw a force diagram for a Fei when she is at the lowest point (marked 'x') of the pendulum. Label all forces properly and include their magnitude.

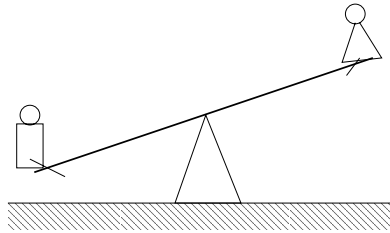
- (b) From your force diagram above, what is the *radial* force on Fei when she is at the lowest point? What is the tangential force?

- (c) Draw a force diagram for Fei when she reaches point 'y' on the diagram.

$$\begin{aligned}
 \text{KE} &= \frac{1}{2}mv^2, & \text{PE} &= mgh, & \mathbf{F}_{\text{all on obj}} &= m\mathbf{a}_{\text{CoM}} & v_{\perp} &= \omega r, & a_{\perp} &= \alpha r, \\
 \mathbf{F}_{\text{all on obj, rad}} &= \frac{mv^2}{r}, & \mathbf{F}_{\text{all on obj, tan}} &= m\mathbf{a}_{\text{tangential}}, & & & & & & \\
 \Delta p &= \mathbf{F}_{\text{all on obj}} \Delta t, & & & \Delta L &= \boldsymbol{\tau}_{\text{all on obj}} \Delta t. & & & & 
 \end{aligned}$$

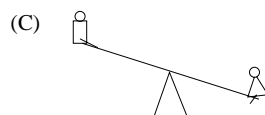
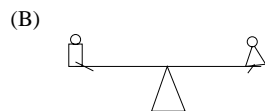
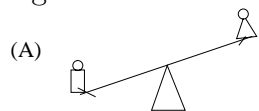
(d) What are the radial and tangential components of the force at 'y'?

2. Jack and Jill are of equal mass and sitting an equal distance from one another on a seesaw, as shown with Jill at the higher end. Initially they are both at rest and Jack's feet are just above the ground, but not touching it. The plank is uniform and pivoted halfway along, so it contributes no torque.



(a) What is the net torque on the plank at the instant shown?

- (b) Which of the following will the see-saw end up like? Choose an answer and explain to the right.



(D) Oscillating between (A) and (C)