The Timber Terror

Notes:

Ride Stats

year built:	1996
length:	818 m
mass of empty train:	5182 kg
length of train:	12.1 m

Measurements:

Time for one complete ride cycle:_____

Angle first hill makes to the horizontal:_____

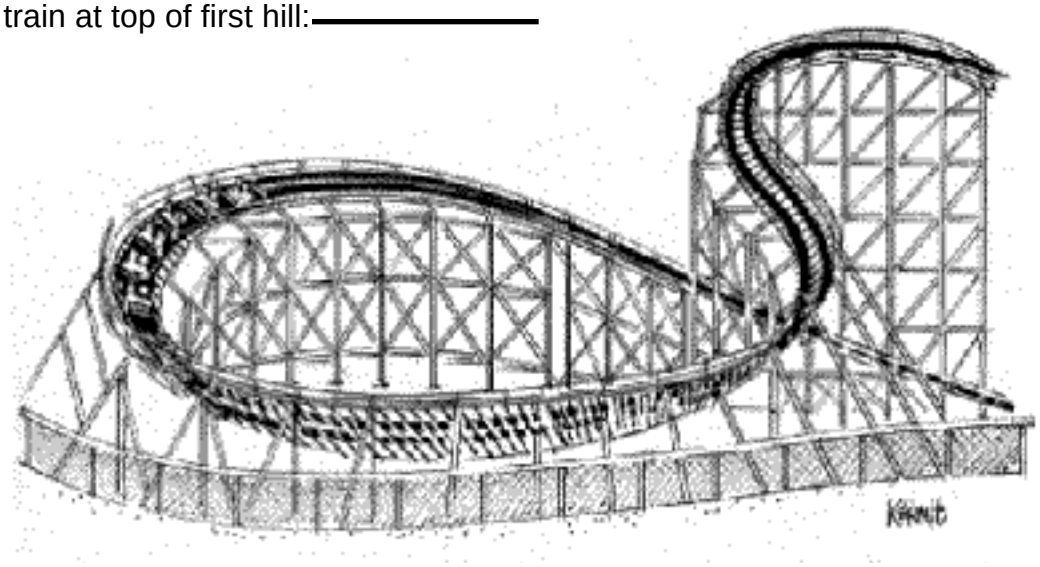
Acceleration (“g’s”) at the top of rise after first drop:_____

Acceleration (“g’s”) at the bottom of first drop:_____

Height of roller coaster at the highest point:_____

Speed of train at bottom of first dip:_____

Speed of train at top of first hill:_____

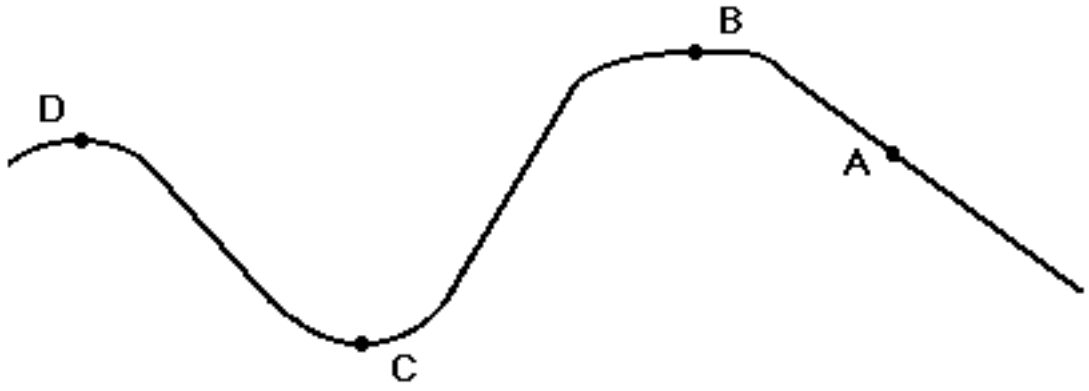


Show all work for the following tasks. Assume friction is negligible.

Task 1:
How much force must the lift motor supply in order to lift the train to the top of the ride?

Task 2:
Ride the roller coaster and measure the "g" forces experienced as the train goes through the dip at the bottom of the initial drop. Use your value for the speed of the train at this point and estimate the radius of curvature of the track at the bottom of the dip. Show your calculations and discuss sources of potential error.

Task 3:
Measure the "g" forces expected at the top of the first hill after the initial drop with your accelerometer. Draw quantitative force diagrams for a 60 kg passenger riding the coaster at the following points.



Task 4:
What is the maximum number of people that can ride the roller coaster in one hour? Explain how you arrived at this answer.

Some people claim that the ride experienced is different depending on whether you are sitting in the first car, a middle car, or in the last car. Considering that all of the cars are connected together and therefore all are moving at the same speed at the same time, how could the experiences be different? If there are differences, what are they?