

Name \_\_\_\_\_ Hour \_\_\_\_\_

## Level 2: Circular Motion and Gravity

1. The Carousel at Valleyfair has a radius of 3.42 m and takes 4.1 sec to circle once. What is the **centripetal force** you would feel if your mass was 95 kg and **how many g's** will you feel? (Find  $v$  first!) (763 N, 0.82 g's)
  
2. Two similar trucks each having a mass of 200,000 kg are 40 m apart.
  - a. What is the gravitational force of attraction between them? (*ans. 0.00167 N*)
  
  - b. What is the weight (how much gravity pulls on mass) of 1 truck? ( $1.96 \times 10^6$  N)
  
  - c. Using the 2 numbers you just calculated, WHY do you think the two trucks do not become attracted to each other like a magnet?
  
3. Calculate the **centripetal force** exerted by the sun on the earth. (The radius of the earth's orbit is  $1.5 \times 10^{11}$  m. You will also need the mass of the earth and its period (T) in seconds.) (*ans.  $3.56 \times 10^{22}$  N*)
  
4.
  - a. Find the **gravitational force** between the earth and the sun. (The radius of the earth's orbit is  $1.5 \times 10^{11}$  m.) (*ans.  $3.5 \times 10^{22}$  N*)
  
  - b. Compare your answers to number **3** and number **4a**. Explain what you notice.

