

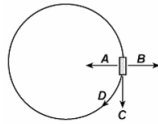
Name \_\_\_\_\_  
Honors Physics  
Period \_\_\_\_\_

Date \_\_\_\_\_  
Gravity and Circles WS #4  
Mrs. Nadworny

### Centripetal Acceleration & Force

**Directions** – Read textbook pages 257 – 262. Solve the following problems using the GUESS method and correct significant figures. Be sure to show ALL work!

1. In the diagram below, a cart travels clockwise at a constant speed in a horizontal circle.

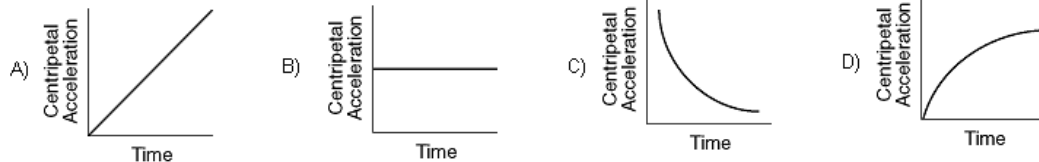


At the position shown in the diagram, which arrow indicates the direction of the centripetal acceleration of the cart?

- A) A                      B) B                      C) C                      D) D
2. In the diagram below, S is a point on a car tire rotating at a constant rate.



Which graph best represents the magnitude of the centripetal acceleration of point S as a function of time?



3. A 2.7 kg object is being swung in a circle of radius 3.6 meters with a constant acceleration of  $6.4 \text{ m/s}^2$ .

a. Calculate the speed of the object.

b. Calculate the force necessary to keep the object moving in a circle.

4. Sid E. Leitz is practicing his lasso skills for the big summer rodeo. He ties a 35 kg mass to the end of a rope and is swinging it at a constant speed of 12 m/s. The tension in the rope is 2500 N. Calculate the radius of the circle.
5. An object of mass  $m$  is moving in a circle of radius  $r$  at a speed  $v$ .
- What happens to the centripetal force if mass is doubled?
  - What happens to the centripetal force if speed is doubled?
  - What happens to the centripetal force if the radius is cut in half?
  - What happens to the centripetal acceleration if the mass is quadrupled?
  - What happens to the centripetal acceleration if the radius is tripled?

Answers in size order: 0 or 1, 1/3, 2, 2, 2.0, 4, 4.8, 17