

Name: \_\_\_\_\_

Precalculus

Circular Motion Project

Cart A and Cart B are at the starting line. Cart A has wheels that are 30 inches in diameter. Cart B has 25-inch wheels. When the starting gun is fired, Cart B begins moving and is given a 100-foot headstart. The wheels of both carts will have an angular velocity of 10 RPM. Round your final answers to 3 decimal places.

a) Draw and label a diagram of this problem at the moment that Cart B is 100 feet from the starting line.

b) Convert the angular velocity into rad/sec.

$$\omega = \text{_____ rad/sec}$$

c) Calculate the linear velocities of each cart.

$$V_A = \text{_____ feet/sec}$$

$$= \text{_____ MPH}$$

$$V_B = \text{_____ feet/sec}$$

$$= \text{_____ MPH}$$

d) Equations you would use to find the distance from the starting line each cart has traveled after  $t$  seconds.

$$D_A(t) = \text{_____ feet}$$

$$D_B(t) = \text{_____ feet}$$

e) Equation to find  $T$ , the total time Cart B travels until it is caught by Cart A.

\_\_\_\_\_

(Solve for  $T$ )

$$f) T = \text{_____ sec}$$

g) Find the total distance traveled by each cart.

$$D_A = \text{_____ feet}$$

$$= \text{_____ miles}$$

$$D_B = \text{_____ feet}$$

$$= \text{_____ miles}$$