

Problem set 2

Assigned: September 15, 2006

due: Friday, September 22 at 5 PM in the box near 2103 Chamberlin

Problems

1. TM 3-72

2. Suppose the position of a car in two dimensions is given by the trajectory

$$\vec{r}(t) = r(t)\hat{r}(t)$$

where

$$r(t) = \alpha t^2$$

$$\hat{r}(t) = \hat{x} \cos(\omega t) + \hat{y} \sin(\omega t)$$

where ω is a constant.

a) Sketch \vec{r} to visualize the motion.

b) Compute the acceleration as a function of time.

c) Compute the velocity and express it in terms of \hat{r} and $\hat{\theta}$.

d) Compute the centripetal and tangential acceleration as a function of time.

3. TM 4-47

4. TM 4-52

6. TM 4-62

7. TM 4-67