Homework #3

Problem 2 - 3.5.6:

$$\mathbf{r} = r cos\omega t \hat{\mathbf{x}} + r sin\omega t \hat{\mathbf{y}} \tag{1}$$

a)

$$\dot{\mathbf{r}} = -r\omega sin\omega t \hat{\mathbf{x}} + r\omega cos\omega t \hat{\mathbf{y}}. \tag{2}$$

Then

$$\mathbf{r} \times \dot{\mathbf{r}} = r^2 \omega \hat{\mathbf{z}}. \tag{3}$$

b)

$$\ddot{\mathbf{r}} = -r\omega^2 cos\omega t \hat{\mathbf{x}} - r\omega^2 sin\omega t \hat{\mathbf{y}}. \tag{4}$$

Then,

$$\ddot{\mathbf{r}} + \omega^2 \mathbf{r} = 0. \tag{5}$$