

Name:

Class quiz 9

November 9, 2016

I) Consider a plane is flying horizontally at an altitude of 3 miles. The plane passes above a radar station with a constant speed of 300mi/hr. At what rate is the distance between the plane and the station increasing when the plane is 5 miles away from the station.

Ans: 240 mi/hr

II) Find the linearization  $L(x)$  of the following function at the give value  $a$ .

a-  $\cos(x)$  at  $a = \frac{\pi}{3}$ .

$$L(x) = -\frac{\sqrt{3}}{2}\left(x - \frac{\pi}{3}\right) + \frac{1}{2}$$

b-  $x^2 + 3x - 1$  at  $a = 1$ .

$$L(x) = 5(x - 1) + 3$$

III) Use linear approximation to approximate  $(0.99)^3$

let  $f(x) = x^3$ , and let  $a = 1$

$$L(x) = 3(x - 1) + 1$$

Then we have the approximation

$$(0.99)^3 \approx L(0.99) = 3(0.99 - 1) + 1 = 3(-0.01) + 1 = -0.03 + 1 = 0.97$$