Wednesday November 2, 2022

2 of them!

Reminders
- MLM on Related Rates due Thursday
- Written HW 4 due Wednesday
- Office hours today 1-2:30 in Locy 203

Recap

Point-slope form of a line

3.9 Linearization

A linearization is

Ex 1. Find the linear approximation to $f(x) = \frac{1}{(1+2x)^4}$ at $x=0$ and use it to estimate $f(0.1)$.

Ex 2. Use a linear approximation to estimate $(8.06)^{2/3}$ by hand.

Ex 3. Atmospheric pressure P decreases as altitude h increases. At a temperature of 15° C, the pressure is 101.3 kPa at sea level, 87.1 kPa at an altitude of 1 km, and 74.9 kPa at an altitude of 2 km. Use a linear approximation to estimate the atmospheric pressure at an altitude of 3 km.

Ex 4. Ponder...

(a) Does a function always have a linearization at a given point $x=c$?

(b) If $f(x)$ has a linearization at $x=c$, is the linearization unique?

(c) When is a function $f(x)$ equal to its linearization?

(d) If the linearization to $f(x)$ at $x=c$ is $L(x)$, is there a max or min on the error of using $L(x)$?

(e) What are some ideas for getting an approximation to $f(x)$ that's better than the linearization?