Monday, November 21, 2016

**Chapter 5.5 - 5.6, 9.2**

**Section 5.5 - Linearization**

**New Seats**

**New Calendar**

**Opener - Half Sheet w/New Partner**

**Notes**


## 5.5 - Linearization

If a curve a differentiable, then it is "locally linear." So the equation the tangent line to the curve approximates the curve near the point of tangency.

**Linearization:**

$$L(x) = f(a) + f'(a)(x-a)$$

(just equation of tangent line solved for y)

is the linearization of f at a. $f(x) \approx L(x)$

$x=a$ is the center of approximation.

Examples

(1) $f(x) = \sqrt{1-x}$ at $x=0$, How accurate is approx. at $x=.1$?

$f(0) = \sqrt{1-0} = 1$ (0,1)

slope: $f'(x) = \frac{1}{2}(1-x)^{-\frac{1}{2}}(-1)$

$f'(0) = \frac{1}{2}(1-0)^{-\frac{1}{2}}(-1)$

$= \frac{-1}{2}$

tangent Line: $y - 1 = \frac{-1}{2}(x - 0)$

Linearization: $y = L(x) = \frac{-1}{2}(x) + 1$

approx: $L(.1) = \frac{-1}{2}(.1) + 1$

$= .95$

actual: $f(.1) = .949$

Error: $|L(.1) - f(.1)| \approx .00132$

Error less than $10^{-2}$