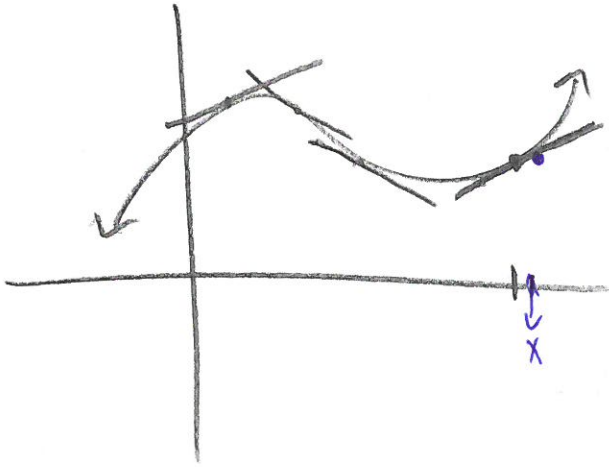


Linearizing  $\Rightarrow$  Approx value on curve using a tangent line equation at a value close to approx.



Ex.

$$f(x) = \frac{1}{5}x^5 - 5x^4 + 6x^3 + 8x^2 - 6x + 1$$

Approx  $f(0.01)$  using the tangent line @  $x=0$ .

Over or under estimate?

Look @ concavity

if concave up, tangent is below curve so under-est.

if concave down, tangent is above curve so over-est.

$$f'(x) = x^4 - 20x^3 + 18x^2 + 16x - 6$$

$$f'(0) = -6 = m$$

$$(0, 1)$$

$$y - 1 = -6(x - 0)$$

$$y = -6x + 1$$

$$f(0.01) \approx -6(0.01) + 1 = -.06 + 1 = .94$$

$$f'' = 4x^3 - 60x^2 + 36x + 16$$

$$f''(0) = 16 > 0 \text{ Concave up @ } x=0$$

tangent line below so approx is under estimate.