

Use linear approximation to estimate the following quantity. Choose a value of a to produce a small error.

$$\sqrt{85}$$

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

$a \rightarrow$ known, easy to compute x -value, close to x

$x \rightarrow$ unknown x -value (85) [only 85, x -value]

$f(x) = \sqrt{x}$ sq. root function

($a = 81$) is an x -val. close to 85, $\sqrt{81} = 9$
 $\hookrightarrow 9^2$

$$\sqrt{98} \rightarrow \sqrt{100} = 10$$

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

$$f(x) = \sqrt{x} = x^{1/2}$$

$$[a=81] f(81) = \sqrt{81} = 9$$

$$f(85) \approx L(85) = 9 + \frac{1}{18}(85-81)$$

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

$$= 9 + \frac{4}{18} = 9.22$$

$$f'(81) = \frac{1}{2} \cdot (9^2)^{-1/2}$$

$$(\text{round to nearest hundredths}) = \frac{1}{2} \cdot 9^{-1} = \frac{1}{18}$$

Poll Q: I understand 100% of this concept.
($a, x, f(a), f'(a), L(x)$)