At which x-value(s) does f have a max?

$x = 0$

At which x-value(s) does f have a min?

$x = 3$

6) Given f(x) = sec x, find its derivative f'(x).

answer: $\sec x \tan x$

Find the linearization for f(x) at x = π/4.

$f(\pi/4) = \sec \pi/4 = \sqrt{2}$

$f'(\pi/4) = \sqrt{2} \cdot 1 = \sqrt{2}$

$y - \sqrt{2} = \sqrt{2}(x - \pi/4)$

linearization: $L(x) = \sqrt{2}(x - \pi/4) + \sqrt{2}$

Use the linearization to estimate sec(π/4 + 0.1)

sec(π/4 + 0.1) ≈ $\sqrt{2}(\pi/4 + 0.1 - \pi/4) + \sqrt{2} = \sqrt{2}(0.1) + \sqrt{2} = 1.1\sqrt{2} = 1.555$

$\sec(\pi/4 + 0.1) \approx 1.579$

What is the % error of this estimate?

$\frac{0.024}{1.579} = 1.5\%$

answer:

7) Use a linearization to estimate √80. $y = \sqrt{x}$

$y' = \frac{1}{2}x^{-1/2}$ $\quad y'(81) = \frac{1}{2\sqrt{81}} = \frac{1}{18}$

$y(81) = 9$ $\quad y - 9 = \frac{1}{18}(x - 81)$ $\quad L(x) = \frac{1}{18}(x - 81) + 9$

$L(80) = \frac{1}{18}(-1) + 9 = 8.944$