

125 HW #7

~~4.1~~ 3.9 2, 28

4.1 7, 36, ~~56~~

3.9 #2

$$f(x) = (2-x)^{-1/2} \quad a=0$$

$$f'(x) = -\frac{1}{2}(2-x)^{-3/2}$$

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

$$= \frac{1}{\sqrt{2}} + \frac{-1}{2} \frac{1}{\sqrt{8}} x = \frac{1}{\sqrt{2}} - \frac{1}{4\sqrt{2}} x$$

3.9 #28

$\sqrt{99.8}$   $f(x) = \sqrt{x} \quad a=100$

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

$$L(x) = \sqrt{100} + \frac{1}{2} 100^{-1/2} (x-100)$$

$$= 10 + \frac{1}{20} (x-100)$$

$$= 5 + \frac{1}{20} x$$

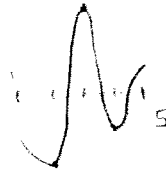
$$\sqrt{99.8} \approx 5 + \frac{99.8}{20} = \text{~~10.01~~ } 9.99$$

4.1 #7

abs min @ 2

max @ 3

low min @ 4



4.1 #36

$$h(p) = \frac{p^{-1}}{p^2+4}$$

$$h'(p) = \frac{(p^2+4) - (p^{-1}) \cdot 2p}{(p^2+4)^2}$$

$$= \frac{p^2+4 - 2p^2+2p}{(p^2+4)^2} = -\frac{p^2-2p-4}{(p^2+4)^2}$$

$$p^2 - 2p - 4 = 0$$

$$p = \frac{2 \pm \sqrt{4+16}}{2} = \frac{2 \pm 2\sqrt{5}}{2} = \frac{1 \pm \sqrt{5}}{1} \\ -1.236 \quad 3.736$$

4.1 #56

$$f(t) = t + \cot(t/2) \quad t \in [\pi/4, 7\pi/4]$$

$$f'(t) = 1 - \csc^2(t/2) \cdot 1/2$$

$$\frac{1}{2} \csc^2(t/2) = 1$$

$$\csc(t/2) = \sqrt{2}$$

$$\sin(t/2) = \frac{1}{\sqrt{2}}$$

$$t/2 = \pi/4, 3\pi/4$$

$$t = \pi/2, 3\pi/2$$

x	f(x)
$\pi/4$	$\pi/4 + \cot(\pi/8) = \sqrt{2} \approx 3.196$
$\pi/2$	<del>2.57</del> min
$3\pi/2$	3.712 max
$7\pi/4$	3.083