

125 HW #10

4.4 4, 18, 34

4.5 3, 8

4.4 #4

a. $\lim_{x \rightarrow \infty} g(x) = 2$

f. horiz: $y=2, y=-2$

b. $\lim_{x \rightarrow -\infty} g(x) = -2$

vert: $x=3, x=0, x=-2$

4.4 #18

$$\lim_{x \rightarrow -\infty} \frac{\sqrt{9x^6 - x}}{x^3 + 1} \cdot \frac{1/x^3}{1/x^3} = \lim_{x \rightarrow -\infty} \frac{-\sqrt{\frac{1}{x^6}(9x^6 - x)}}{1 + 1/x^3}$$

$$= \lim_{x \rightarrow -\infty} \frac{-\sqrt{9 - 1/x^5}}{1 + 1/x^3} = -\sqrt{9} = \underline{-3}$$

4.4 #34

$$\frac{x^2 + 1}{2x^2 - 3x - 2}$$

horiz. tote: $y = \frac{1}{2}$

vert tote: $2x^2 - 3x - 2 = 0$

$$(2x + 1)(x - 2) = 0$$

$$x = -1/2 \text{ or } x = 2$$

two vertical asymptotes at $-1/2$ and 2 .

4.5

4.5 #3

$$f(x) = 2 - 15x + 9x^2 - x^3$$

$$f(0) = 2$$

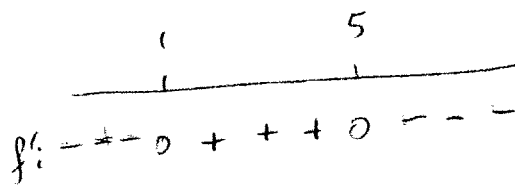
$$f'(x) = -15 + 18x - 3x^2$$

$$f''(x) = 18 - 6x$$

f' :

$$3x^2 - 18x + 15 = 0$$

3 1 1 15



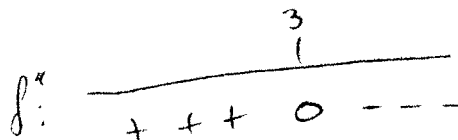
$$(x-1)(3x-15) = 0$$

$$x = 1 \text{ or } x = 5$$

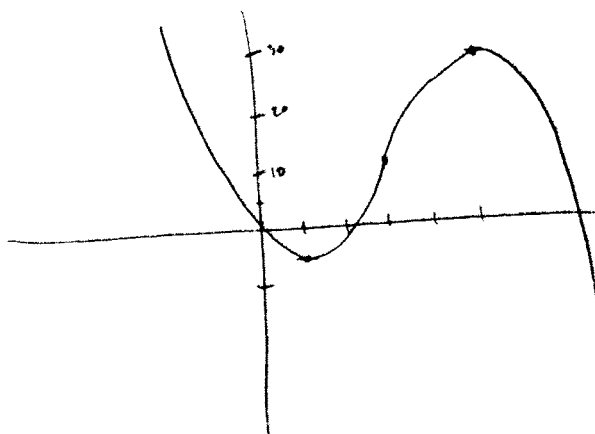
f'' :

$$18 - 6x = 0$$

$$x = 3$$



	1	3	5	
f	-5	11	27	
f'	- - - 0	+ + +	+ + + 0	- - -
f''	+ + + + +	+ 0	- - - - -	



4.5 #8

$$f(x) = (4-x^2)^5$$

$$f'(x) = 5(4-x^2)^4 \cdot -2x$$

$$= -10x(4-x^2)^4$$

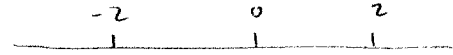
$$f''(x) = -10x \cdot 4(4-x^2)^3 \cdot -2x + (4-x^2)^4 \cdot -10$$

$$= -10(4-x^2)^3 (-8x^2 + 4 - x^2)$$

$$f': -10x(4-x^2)^4 = 0$$

$$x=0 \text{ or } (4-x^2)^4 = 0$$

$$x = \pm 2$$



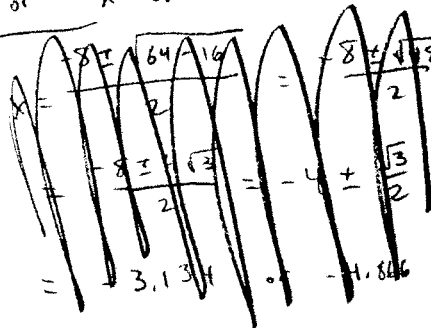
f' : + + 0 + + + 0 - - - 0 - - -

$$f'': +10(4-x^2)^3(x^2+8x^2-4) = 0$$

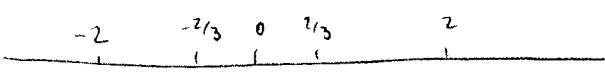
$$x = \pm 2 \text{ or } x^2 + 8x^2 - 4 = 0$$

$$9x^2 - 4 = 0$$

$$x = \pm \frac{2}{3}$$



f'' : - - - 0 + + 0 - - - 0 + + 0 - - -



f : 0 568 1024 568 0

f' : + + 0 + + + 0 - - - 0 - - -

f'' : - - - 0 + + 0 - - - 0 + + 0 - - -

