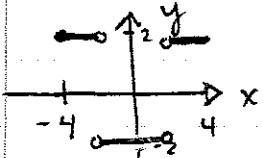


Key Final Exam Math III Fall 2006

I

1. a) ii b) i
2. a) 2 b) $-\infty$ c) DNE since $\lim_{x \rightarrow 2^-} f(x) \neq \lim_{x \rightarrow 2^+} f(x)$
d) -2
3. a) F b) T c) T d) T e) F
4. $f'(x) = 2x^4 \cos x + 8x^3 \sin x$
5. 19
6. $\frac{3}{2}$
7. $y = x$
8. $g'(x) = -\cos 2x^3$
9. 0

II

1. $r = -4$
2. $-\frac{1}{8}$
3. 
4. a) $f'(a) = \lim_{h \rightarrow 0} \frac{f(a+h) - f(a)}{h}$ or $f'(x) = \lim_{h \rightarrow 0} \frac{f(x+h) - f(x)}{h}$
5. a) $g'(t) = \frac{5}{2(5t+6)}$ b) $f'(x) = 4 \left(\tan(\sqrt[3]{x}) \right)^3 \sec^2(\sqrt[3]{x}) \cdot \frac{1}{3} x^{-2/3}$
c) use logarithmic differentiation: $g'(x) = y' = x^{\sqrt{x}} \left(x^{-1/2} \left(1 + \frac{1}{2} \ln x \right) \right)$
6. d) $y' = \frac{-2y}{2x-3y^2} = \frac{2y}{3y^2-2x}$
7. a) $y = -\frac{1}{2}x + 1$
b) $x = -1$ is a V.A.
c) $y = 0$ is a H.A.
8. $\frac{dh}{dt} = -63.64$ mph or decreasing at a rate of 63.64 mph

8. a) 2 b) e^{-2}

9. length of pen = 222.5 ft, ends + dividers = 89 ft.
Total area = 19,802.5 ft^2

10. a) $f'(x) = 90x^9 - 90x^8 \Rightarrow x=0$ or $x=1$ are CN's.

b) f is increasing on $(1, \infty)$

c) local min at $(1, -1)$

d) concave down on $(0, \frac{8}{9})$

e) IP @ $(0, 0)$ and $(\frac{8}{9}, -0.6928)$

11. $L_5 = 9.7$ and $R_5 = 7.3$ so best estimate = $\frac{9.7+7.3}{2}$

12. a) $v(5) = -96$ ft/sec = 8.5 inches

b) $t = 2$

c) $s(0) = 80$ ft so building is 80 ft. tall

13. a) $g(0) = 0$

b) $g(10) = -8$

c) $g(4) = 8$

d) $x = 2$

14. a) $-\cos e^x + C$

b) $\ln|x| + \frac{1}{2}[\ln x]^2 + C$

c) 640.5

d) 0.7854