M144 Calculus I **Some Final Exam Review Problems** **Spring 2008**

Answers

Note that these are NOT complete solutions and would not receive full credit on an exam.
These are just the answers so that you can check whether you correctly solved the problems.

1. a. $y=\frac{1}{2}(x^2+5x+1)^{-1/2}(2x+5)$ **b.** $y=\frac{1}{x}\cdot\cos(4x)+(-\sin(4x))\cdot 4\cdot\ln x$ **c.** $y=\frac{-e^{-x}(x^2+1)-(2x)e^{-x}}{(x^2+1)^2}$

2. a. $u=3x^2-1$ **b.** $du=6xdx$ **c.** $\frac{1}{6}\int\cos u\,du$. **d.** $\frac{1}{6}\sin u+C$. **e.** $\frac{1}{6}\sin(3x^2-1)+C$

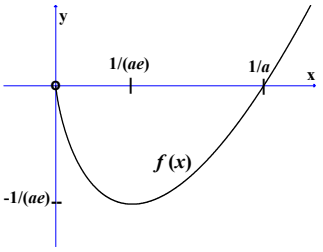
3.a. 15 mi. **b.** 20mi. **c.** at 2.5 hrs, 17.5 mi. from home. **d.** $2<x<2.5$ **4.** h = 5/4m base = 2m.

5. a. 98.34 **b.** 256/3 **6.** 440 ft. **7.** 1 – E, 2 – BC, 3 – AF, 4 – BC, 5 – D

8. a) 0 **b)** 2 **c)** DNE **d)** $+\infty$ **e)** 4

9. a) $x=\frac{1}{a\cdot e}$ **b)** $f''(\frac{1}{a\cdot e})=ae>0$ so f is cc up at this critical point. Hence it is a min.

c) $f''(\frac{1}{x})>0$ for all $x>0$. (i.e. $f''(x)$ is never zero. So $f(x)$ is always cc up.



10. a) 12 **b)** –5 **c)** 13 **d)** $f''(3)=-2<0$ so $f(x)$ is cc down at $x=3$. So an overestimate.

11. a) $\int_0^{40} r(t)\,dt=$ total oxygen. b) 2000 deciliters. c) At inflection point, $x\approx 20$.

12. a. $u=2x^2+3$ **b.** $du=4x\,dx$ **c.** $\frac{1}{4}\int\sin u\,du$. **d.** $-\frac{1}{4}\cos u+C$. **e.** $-\frac{1}{4}\cos(2x^2+3)\Big|_2^5=0.2306$

13. $r\cong 0.576\cdot v^{1/3}$

14. **a)** $y=\frac{1}{x^2-4x}(2x-4)$ **b)** $y=5e^{5x}\cos(x)+e^{5x}(-\sin(x))$ **c)** $y=\frac{1(x^2+1)-2x(x)}{(x^2+1)^2}$

15. a) 4.5 **b)** 3 **c)** $x=4$ **d)** $x>4$ **e)** $2<x<5$ **f)** $x=4$ **g)** $x=2$.

16. 0.14 deg/min **17.** 1.6 m/sec

18.

b. On day 10 spreading at approx. 15 cases/day
c. Day 20
d. Day 40
e. Day 130.