

Last Name:-----

Instructor:-----

First Name:-----

Math 150  
Group Final (Fall 2003)

This is the part of the Math 150 Final Exam that is common to all sections. You are not allowed to use notes, books or calculators. No personal stereos are allowed. You have exactly one hour. You will not be handed the second part of the exam before 9 AM.

**No partial credit will be assigned. Check your work carefully.**

**Points**

1. \_\_\_\_/6
2. \_\_\_\_/7
3. \_\_\_\_/7
4. \_\_\_\_/6
5. \_\_\_\_/6
6. \_\_\_\_/6
7. \_\_\_\_/6
8. \_\_\_\_/7
9. \_\_\_\_/7
10. \_\_\_\_/7
11. \_\_\_\_/7
12. \_\_\_\_/7
13. \_\_\_\_/7
14. \_\_\_\_/7
15. \_\_\_\_/7

Determine the finite limit, the infinite limit, or state that the limit does not exist in either the finite or infinite sense.

1.  $\lim_{t \rightarrow 3^-} \frac{t}{3-t}$

Ans:.....(6 pts)

In problems 2 and 3, use L'Hospital's rule to determine the limit.

2.  $\lim_{x \rightarrow 0^+} x \ln(x)$

Ans:.....(7 pts)

3.  $\lim_{x \rightarrow 0} \frac{e^x - 1 - x}{x^2}$

Ans:.....(7 pts)

In problems 4 through 7, determine the derivative.

4.  $\frac{d}{dx} x^2 \sin(x)$

Ans: \_\_\_\_\_(6 pts)

5.  $\frac{d}{dx} (3 - 2x)^{1/2}$

Ans: \_\_\_\_\_(6 pts)

6.  $\frac{d}{dx} e^{1/x}$

Ans: \_\_\_\_\_(6 pts)

7.  $\frac{d}{dx} \int_{\pi}^x \cos(t^2) dt$

Ans: \_\_\_\_\_(6 pts)

In problems 8 and 9, evaluate the derivative as indicated.

8.  $\frac{d}{dx} \frac{x}{x^2 + 2} \Big|_{x=1}$

Ans: \_\_\_\_\_(7 pts)

9.  $\frac{d}{dx} \arcsin\left(\frac{x}{2}\right) \Big|_{x=0}$

Ans: \_\_\_\_\_(7 pts)

In problems 10 through 12, determine the antiderivative.

10.  $\int \frac{1}{1-2t} dt$

Ans: \_\_\_\_\_(7 pts)

11.  $\int x \sin(x^2) dx$

Ans: \_\_\_\_\_(7 pts)

12.  $\int \sqrt{1+3x} \, dx$

Ans: \_\_\_\_\_(7 pts)

In problems 13 through 15, evaluate the integral.

13.  $\int_{-1}^0 \frac{1}{(1-x)^3} \, dx$

Ans: \_\_\_\_\_(7 pts)

14.  $\int_1^e \frac{(\ln(t))^2}{t} dt$

Ans: \_\_\_\_\_(7 pts)

15.  $\int_2^{2\sqrt{3}} \frac{1}{4+x^2} dx$

Ans: \_\_\_\_\_(7 pts)

1.  $+\infty$
2.  $0$
3.  $\frac{1}{2}$
4.  $2x \sin(x) + x^2 \cos(x)$
5.  $-\frac{1}{\sqrt{(3-2x)}}$
6.  $-\frac{1}{x^2}e^{1/x}$
7.  $\cos(x^2)$
8.  $\frac{1}{9}$
9.  $\frac{1}{2}$
10.  $-\frac{1}{2} \ln(|1-2t|)$
11.  $-\frac{1}{2} \cos(x^2)$
12.  $\frac{2}{9}(1+3x)^{\frac{3}{2}}$
13.  $\frac{3}{8}$
14.  $\frac{1}{3}$
15.  $\frac{1}{24}\pi$