

Calculus I, MAT 1214 (3)  
Midterm, March 6, 1996  
Instructor: D. Gokhman

Name: \_\_\_\_\_

Box your answers. Show work. Answers alone are not sufficient.

1. (40 pts.) Find the following limits:

(a)  $\lim_{x \rightarrow 2} \frac{\frac{1}{x} - \frac{1}{2}}{x - 2}$       (b)  $\lim_{x \rightarrow 1^+} \frac{|x - 1|}{1 - x}$       (c)  $\lim_{x \rightarrow 0} \frac{x}{\sin 2x}$       (d)  $\lim_{x \rightarrow 0} x^4 \sin\left(\frac{1}{x}\right)$

2. (40 pts.) Differentiate the following functions:

(a)  $(x - 1)^5 \sqrt{x + 1}$       (b)  $\frac{x}{x^3 + 1}$       (c)  $\sqrt{1 - \sqrt[3]{x}}$       (d)  $\cos^7 x^7$

3. (20 pts.)

- (a) Find equations for the two lines tangent to  $y = x^4$  at  $x_0 = -2$  and at  $x_0 = 2$ .  
(b) What is the point of intersection of these two tangent lines?

4. (20 pts.)

- (a) Find the critical points of the function  $f(x) = |x|$ .  
(b) Find the minimum and maximum values of this function in the interval  $[-1, 2]$ .

1	2	3	4	total (120)