

MATH 160-03  
EXAM 1  
SEPTEMBER 14, 1999

NAME

TO RECIEVE CREDIT YOU MUST SHOW YOUR WORK.

1. (10) Graph the function  $f(x) = \begin{cases} x + 1 & \text{for } x \leq 2, \\ -x + 4 & \text{for } x > 2. \end{cases}$

2. (5) Let  $f(x) = \frac{x-2}{x+1}$  and  $g(x) = \frac{x+3}{x-1}$ . Express  $f(x) + g(x)$  as a rational function

3.(10) Find the point of intersection of  $y = x^2 + 3x - 4$  and  $y = 5x + 11$ .

4. (5) Simplify  $\frac{(8x^2y)^{\frac{2}{3}}}{x^{\frac{1}{3}}y^{\frac{5}{3}}}$

5. (10) Consider an open rectangular box with a square base.

a) Assign letters to the dimensions.

b) Write an expression for the volume in terms of the variables

6. (10) Write the equation for the line that passes through the points  $(-1, 7)$  and  $(3, -2)$ .

7. (10) Let  $f(x) = x^2 - 5x + 7$ . Find  $f'(x)$ , using the limit definition of the derivative.

8. (10) a) Find  $\lim_{x \rightarrow 3} (2x^2 - 3x + 7)$

b) Find  $\lim_{x \rightarrow 2} \frac{x^2 - 2x}{x^2 - 7x + 10}$ .

9. (5) Give an example of a function  $y = f(x)$  that is not continuous at  $x = 3$ .  
(Give the graph of the function or give the function using formulas.)

10. (15) Find the derivative of each of the following:

a)  $y = x^3 - 5x^2 + 7x - 3$

b)  $f(x) = \frac{4x^2}{9} - \frac{3}{2x^2}$ .

c)  $y = (x^3 + 8x)^6$ .

11. (10) Write the equation of the tangent line to  $y = f(x) = x^3 - 2x + 1$  at  $x = 2$ .