

# Math 180 C

## FIRST HOUR EXAM

NAME \_\_\_\_\_

### General Notes:

1. Show work.
2. Look over the test first, and then begin.
3. Calculators are not permitted on this exam.

Friday, Sept. 22, 2006

I. Functions

1. (5 pts. each except as noted)

a) What is a function? Give an informal (but complete) definition

In the following, let  $f(x) = 2x + 1$  and  $g(x) = x^2$ . Please give your answers to the following in terms of  $x$  (i.e., give your answers as functions).

b. What is  $(f+g)(x)$ ?

c. What is the composition  $f \circ g$  of functions  $f$  and  $g$ ?

d. (10 pts.) What is the inverse of  $f$ ?

2. Simplify the following expressions to a number (5 pts. each - remember - no calculators)

a.  $\frac{3^{\left(\frac{5}{4}\right)}}{3^{\left(\frac{1}{4}\right)}}$

b.  $\left(\frac{\sqrt{5}}{10}\right)^2$

c.  $2^{\log_2 3}$

d.  $\log_3 9$

e. Express  $\log_2 9$  in terms of natural logs (ln)

3. Solve for x (5 pts. each)

a.  $2^{3x} = \frac{1}{8}$

b.  $\log_2 x = 3$

4. (10 pts) What is  $\sin(\arccos(\frac{3}{5}))$ ? Please give a numeric solution.

## II. Limits and the like

1. (10 pts.) Give an informal definition of  $\lim_{x \rightarrow a} f(x) = L$  as you would explain it to an intelligent friend who has not yet taken Math 180.

2. (5 pts. each) Find the following limits:

- a.  $\lim_{x \rightarrow 2} (x^2 + 2x - 1)$

- b.  $\lim_{x \rightarrow 2} \frac{x - 2}{x^2 - 3x + 2}$

c. To what number does

$$\lim_{h \rightarrow 0} \frac{f(x+h) - f(x)}{h} \text{ approach for } f(x) = x^2 + 1 \text{ and } x = 1?$$

III. Getting ready for a future exam (5 pts.)

An open box is to be made from a tin sheet 10" square by cutting out squares of equal size on each corner and bending up the sides thus produced. Express the volume as a function of  $x$ . See the (attempted) diagram

