MATH 113 – FALL 2002 **Name:**

Exam I (October 1,2002)

Part A In Class

Show all work.

Include units in your answers.

1. a) If $f(x, y, z) = \frac{\sqrt{x+\sqrt{y}}}{z}$, evaluate $f(1, 9, 2)$.

b) Write the number 5.2×10^{10} without scientific notation.

c) Sketch a graph which is concave up from $x = 0$ to $x = 4$ and has a minimum at $x = 1$.

2. The cost of opening a widgit factory is \$20000. Each widgit sold generates \$10 in revenue. Let P denote the profit when n widgits are sold.

a) Find a formula for $P(n)$.

b) Express in function notation the profit when 3000 widgits are sold and find its value.

c) How many widgits must be sold just to break even.

3. The following graph represents the number of new cases, N, (in 1000s) diagnosed in the United States of a particular disease t years after 1900.

a) What year are there the most new cases diagnosed?

b) When is the rate of new cases being diagnosed increasing the fastest?

c) How many points of inflection are there on the graph? When does it (do they) occur?

d) Explain in english the significance of the point(s) of inflection in this example.

e) Estimate the limiting value of this function.

f) What reason(s) might explain your answer in e)?

4. The following table represents the number of households, R, in the United States with a record player t years after 1940.

t	R
0	30
10	50
20	100
30	120
40	130
50	70
60	30

a) Over what ten-year period is the number of record players increasing the fastest?

b) Find the average rate of change of the number of record players per year between 1990 and 2000.

c) Estimate the number of record players in the U.S. in the year 1998.

d) What is happening in the years after 1980? Why do you think it is happening?