MATH 205 EXAM 1

7:30–8:30 pm, Thursday September 14, 2006

Instructor's Name:_____ **Name:**_____

No books or formula sheets are allowed. Use the back page as a sketch paper. For full credit, show your work in detail.

Total: 100	#1	#2	#3	#4	#5	#6	#7	#8

1 (15 pts). Indicate which of the following data in the tables represents, respectively,linear function, exponential function, or neither.

x	$y = f(x)$	$y = g(x)$	$y = h(x)$
0	10.5	30.12	27
1	12.7	18.072	24
2	18.9624	10.8432	21
3	36.7	6.5059	18

For the linear function, write out its equation ($y = mx + b$, find m, b).

For exponential function, write out its equation ($y = P_0 a^x$, find the P_0, a.)

2 (10 pts). A \$15,000 robot depreciates linearly to zero in 10 years.

(a). Find a formula for its value as a function of time.

(b). How much is the robot worth three years after it is purchased ?

3 (13 pts). The supply and demand functions for a certain product are given in terms of price,p,by $q = S(p) = 10p - 500$ and $q = D(p) = 2500 - 20p$ where p stands for the price while q for the quantities of the product.

(a. 7 pts) Find the equalibrium price and quantity. (Do no draw a graph.)

(b. 6 pts). If a tax of \$6 per unit is imposed on suppliers, find the new equilibrium price and quantity.

4(12 pts). Write the following functions in the form $y = kx^p$.

- **a (6pts).** $y = \dfrac{5}{x}$

- **b (6pts).** $y = \dfrac{3}{2\sqrt{x}}$

5 (13 pts). Solve for t using natural logrithm:

- **a (6pts).** $40 = e^{-0.5t}$

- **b (7pts).** $7 \cdot 3^t = 5 \cdot 2^t$

6 (12 pts).

Let $f(x) = x^2 + 1$ and $g(x) = \sqrt{x}$. Find formula for each of the following composite function.

- **a (4pts).** $g(f(x)) =$

- **b (4pts).** $f(g(x)) =$

- **c. (4pts).** $f(f(x)) =$

7(13 pts). A bank offers a 6% annual rate compounded continuously.

(a. 8 pts). A deposit of $10,000$ is made into an account with this bank, find the future value of this account in 10 years.

(b. 5 pts). Find the effective annual yield (effective rate).

8(12pts). A radioactive substance decreases by 5% in 10 days, find its half-life.