MATH 205 EXAM 1

7:30–8:30 pm, Thursday February 15, 2007

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 (13pts). Find out which of the following tables represents, respectively, a linear function or an exponential function.

x	$y = f(x)$	$y = g(x)$
0	30.12	27
1	18.072	25.5
2	10.8432	24

For 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 (12 pts). The demand and supply functions are given in terms of price, p, by $q = 2500 - 20p$ and $q = 10p - 500$.

- **a. pts.** Find the equilibrium price and quantity(Do not draw graph).

- **b.** If a tax of \$6 per unit is imposed on the suppliers. Find the new equalibrium of price and quantity.

3 (12pts). (a). Solve for t using natural logarithm: $5e^{3t} = 8e^{2t}$.

(b). Write the function $y = \dfrac{5}{2\sqrt{x}}$ into the form $y = kx^p$.

4(13 pts). (a. 5pts). A cup of coffee contains 100 mg of caffeine, the amount $P(t)$ at the time t, decreses exponentially in body according to $P(t) = 100e^{-0.17t}$. Find the half-life of caffeine.

(b. 4pts) A bank offers an annual rate $r = 5\%$ compounding continously.

(a. 4pts). What is the doubling time?

(b. 4pts). Find the effective annual yield.

5. (13pts). Graph the new function $f(x-1)$ on same coorinate where the graph of $f(x)$ is given by

6 (12 pts). The function $g(x)$ is given by the following table. Find the values of derivatives $g'(4.2)$ and $g'(6.2)$.

x	2.7	3.2	3.7	4.2	4.7	5.2	5.7	6.2
$g(x)$	3.4	4.4	5.0	5.4	6.0	7.4	9.0	11.0

7 (12pts). Sketch graph the derivative of the given function using the same coordinate.

8 (13pts). **(a. 6pts)**. Find the derivative of the function $y = \ln x$ at $x = 2$ using the method of small interval.

(b. 7pts). For a given function $y = f(x)$ if $f(20) = 68$ and $f'(20) = -3$, estimate the values of $f(19)$ and $f(25)$ using local linear approximation.