Math 205 Exam 1

Thursday September 18

Your name:_____

Instructor's name:_____ **Time the class meets:**_____

Calculators are permitted (in fact, you need a calculator to solve some of the problems), but no books or formula sheets are allowed. Use the back pages as sketch paper. For full credit, show your work in detail. If you use a calculator at some step, you should state that you are doing so.

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

1. (10 points) Find the equation of the line that passes through the points (3,3) and (-1,1).

2. (10 points) For the function $f(x)$ represented by the following table decide whether it is linear or exponential. Find a possible formula for $f(x)$.

x	0	1	2	3
$f(x)$	4	3.6	3.24	2.916

3. (15 points) (a) What is the annual percent decay rate for $P = 25(0.88)^t$, with time, t, in years?

(b) Write this function in the form $P = P_0 e^{kt}$. What is the continuous decay rate?

4. (10 points) The antidepressant fluoxetine (or Prozac) has a half-life of about 3 days. What percentage of a dose remains in the body after one day? After one week?

5. (15 points) The function $m(t)$ is given by the following graph:

(a) Graph the function $k(t) = m(t) + 1$.

(b) Graph the function $r(t) = m(t + 1)$.

6. (20 points) (a) What is the degree of the polynomial $f(x) = -9x^5 + 82x^3 + 12x^2 - 100x$? What is its leading term?

(b) What power function approximates $f(x)$ for large x? Sketch the graph of the function in a large window (you can do it without using a calculator).

(c) Using a calculator, sketch a graph of the function. How many turning points does the function have? (Hint: use the window with $X_{min} = -3$, $X_{max} = 3$.) Estimate from the graph both the x and y coordinates of the turning points.

7. (10 points) Find the effective annual yield of a 6% annual rate compounded

(a) annually

(b) monthly

(c) continuously

8. (10 points) The distance (in feet) of an object from a point is given by $s(t) = t^2$, where time t is in seconds.

(a) What is the average velocity of the object between $t = 3$ and $t = 5$?

(b) By using smaller and smaller intervals around 3, estimate the instantaneous velocity at time $t = 3$.