MATH 108 – 29 SEPTEMBER 1998 – EXAM 1

Answer each of the following questions. Show all work, as partial credit may be given.

1. (10 pts.) Find an equation for the line that passes through the points $(-1, 4)$ and $(2, 2)$ and sketch this line, clearly labelling at least 3 points on the line with their coordinates.

2. Membership costs in a local pool consist of a \$100 fixed fee plus a \$8 charge every time you visit the pool.

(a) (10 pts.) Express the total cost as a function of the number of visits.

(b) (10 pts.) If you had a total of \$260 to spend, how many times could you visit the pool?

3. (10 pts.) Is the function $f(x) = \begin{cases} x+3 & \text{if } x < 1 \\ x-1 & \text{if } x \geq 1 \end{cases}$ continuous at $x = 1$? Fully explain your answer.

4. (10 pts.) The average SAT scores of the entering freshmen at a certain university have been declining at a constant rate since 1990. Suppose that in 1990, the average SAT score was 800 and in 1995 the average SAT score was 750. Express the average SAT score, A, as a *linear* function of the number of years since 1990, t.

5. (10 pts.) A retailer sells a certain product. Suppose that at price x, the retailer can sell $400 - x$ units of the product and that the product costs the retailer \$5 per unit. Express the total profit, P, as a function of the selling price, x.

6. Evaluate the following limits.

(a) (10 pts.) $\lim_{x \to 2} \dfrac{x^2 - 3x}{x + 1}$

(b) (10 pts.) $\lim_{x \to 1} \dfrac{x^2 + x - 2}{x - 1}$

7. Evaluate the following limits.

(a) (10 pts.) $\lim_{x \to \infty} \dfrac{x^2 - 3x}{1 - 2x^2}$

(b) (10 pts.) $\lim_{x \to \infty} \dfrac{x - 2}{x^2 - 1}$