TEST #1 (worth 100 points), MA 125, FALL 2001

Write the answers in the space provided.

1 (12 pts) Sketch the graph of the function given by $f(x) = (x+1)^2$ for $x < -2$ and $f(x) = -x^2+2$ for $x \geq -2$. What is the point of discontinuity of this function, what are the one-sided limits at this point and from what side is the function continuous and discontinuous at that point?

2 (11 pts) Evaluate the limit if it exists: $\lim_{t\to -2} \frac{t^2-t-6}{t^2+t-2}$

3 (11 pts) Evaluate the limit if it exists: $\lim_{x\to 3} \frac{\sqrt{x-2}-1}{x-3}$

4 (11 pts) Let $3x - 1 \leq h(x) \leq x^2 + 5x$. Find $\lim_{x\to -1} h(x)$.

5 (11 pts) Show that if a continuous function $f(x)$ is such that $f(-2) = 6$ and $f(4) = -10$ then there exists $c, -2 < c < 4$ such that $f(c) = \pi$.

6 (11 pts) Find the limit $\lim_{x\to\infty} \frac{-x^3+3x+13}{x^3-11}$.

7 (11 pts) Find the limit $\lim_{x\to -\infty} \frac{x^4+x^2+12}{-x^4+21}$.

8 (11 pts) A car moves along a freeway so that at the time t its location is given by $s(t) = t^3 - 2t$. Find the velocity and the acceleration of the particle at the moment t and show all your work.

9 (11 pts) Find the one-sided limits of the difference quotient of the function $f(x) = |2x - 1|$ at $x = .5$. Does the derivative of $|x|$ exist at .5? Explain!!!!