Problem Set 1   **Calculus 2**   **Due 1/23/09**

You are encouraged to work in groups of two to four on this assignment and make a single group submission. Each problem is worth 5 points. For full credit indicate clearly how you reached your answer. All work must be legible and submitted on clean paper without ragged edges.

1. a) A car is traveling 120 feet per second along the interstate, and suddenly hits its brakes to avoid hitting a rhinoceros. If the car decelerates by 20 feet per second each second until coming to a stop, how much distance does it travel before coming to a stop?

    b) If the car is traveling 10% faster when the brakes are first applied, how much does this affect the stopping distance?

2. a) Suppose that a second car is closely following the car from problem 1a. If the second car is two car lengths (30 feet) behind the first at the instant the first driver hits the brakes, and the second driver manages to hit the brakes half a second after the first, what happens (i.e., how much space is there between the two cars when they come to a stop, or do they collide and if so how soon)?

    b) For what reaction time (the span of time between the first driver hitting the brakes and the second hitting the brakes) will the two cars exactly touch when they come to a stop?