Math125 Midterm 2
Nov. 5, 2001
Show your work/reasoning/computations.

1.(30 pts) Differentiate the following functions.
a)
$$f(x) = \frac{x+1}{x^2+1}$$

b)
$$f(x) = (3x+1)^2(x^2+1)^3$$

c)

$$f(x) = \ln(\ln x)$$

d)

$$f(x) = e^{\sin x}$$

e)

$$f(x) = \tan(x^2 + x)$$

f)

$$f(x) = \arctan(x^2 + x)$$

Express the answer by x only.

2.(15 pts) The graph of the velocity function $v(t)$ of a car is shown in the fugure. Sketch the graph of the position function $s(t)$.

3.(20 pts) Two cars start moviong from the same point. One travels east at $40mph$ and the other travels north at $30mph$. At what rate is the distance between the two cars increasing two hours later from the start? (To get started, use the following notations; $x(t)$ the position of the first car along the x axis, $y(t)$ the position of the second along the y axis.)

4.(20 pts) **a)** Draw the set of points satisfying $x^2 - y^2 = 5$ and plot the point $(3, 2)$ on it.

b) Find an equation of the tangent line to the set $x^2 - y^2 = 5$ at $(3, 2)$ (Hint: use implicit differentiation)

c) Find points on the set $x^2 - y^2 = 5$ where the slope of the tangent line is $\sqrt{6}$.

5.(15 pts) Explain why the approximation

$$(1.01)^8 \approx 1.08$$

is reasonable.