MATH 113 – MAPLE ASSIGNMENT 2 – DUE 20 MARCH 2007

Answer all of the following questions. You may work in groups of no more than three persons to complete this assignment. One copy of the completed assignment is to be turned in for each group. **Each member of the group must sign the assignment.**

You are expected to turn in a printout of a MAPLE worksheet containing the MAPLE commands and output that you used to complete the assignment. You must also include text explaining what you are doing (this can be typed onto the MAPLE worksheet or written by hand on the printout). Include any hand calculations.

This assignment is due by the end of class on Tuesday 20 March 2007. **No late assignments will be accepted under any circumstances whatsoever.** If you are not finished with the assignment by the due date, you should turn in what you have for partial credit. You may turn in the assignment early if you wish.

1. (4 pts. each)

(a) Define the function $f(x) = \dfrac{x^3}{\sqrt{x^4+5}}$ as a MAPLE procedure and plot the graph of this function using the MAPLE `plot` command in the horizontal viewing window `x=-3..3`.

(b) Use MAPLE to calculate the derivative of $f(x)$ using MAPLE's `D` command. (For example, type `g:=x->D(f)(x)` at the MAPLE prompt.) Plot the derivative of the function and the function itself on the same set of axes in the same horizontal viewing window as in part (a).

(c) Use MAPLE to find equations for the tangent lines to the graph of $f(x)$ at the points $x = 1$ and $x = -2$. Plot graphs of the tangent lines and of the function itself on the same set of axes in the same horizontal window as in parts (a) and (b).

2. (4 pts. each) A particle has an equation of motion given by $s(t) = 2t^3 - 9t^2$, $0 \leq t \leq 5$ where s is the position in meters and t the time in seconds.

(a) Use MAPLE to find the velocity and acceleration as functions of t.

(b) Plot each of the three functions (position, velocity, and acceleration) on the same set of axes. Use a horizontal viewing window of $[0, 5]$.

(c) Use the graph you found in part (b) to determine the time intervals during which the particle is speeding up and slowing down. Explain your answer.