NAME ........................................................T utorial Group ......
(Please underline your family name.)

Math130 D1/E1 2003
Assignment 1 Due: Wednesday 02/04/03

Please complete all the details on this page, sign the declaration, and 
 staple this sheet to the front of your solutions.

PLAGIARISM

Plagiarism involves using the work of another person and presenting it as 
one’s own. For this assignment, the following acts constitute plagiarism:
  a) Copying or summarizing another person’s work.
  b) Where there was collaborative preparatory work, submitting sub-
     stantially the same final version of any material as another student. En-
     couraging or assisting another person to commit plagiarism is a form of 
     improper collusion and may attract the same penalties.

STATEMENT TO BE SIGNED BY STUDENT

1) I have read the definition of plagiarism that appears above.

2) In my assignment I have carefully acknowledged the source of any 
   material which is not my own work.

3) I am aware that the penalties for plagiarism can be very severe.

4) If I have discussed the assignment with another student, I have written 
   the solutions independently.

SIGNATURE ................ STUDENT NUMBER .......... 

Failure to sign the declaration may result in the assignment being returned 
unmarked.
1. Find the equations of the following straight lines.

   (a) The line joining (2, 2) and (5, 8).
   (b) The line through (−2, 5) with slope $-\frac{7}{4}$.
   (c) The line through (3, −6) parallel to the line $5x - 3y = 10$.
   (d) The line through (1, 3) perpendicular to the line $5x - 3y - 3 = 0$.

2. Let $P = (x_0, f(x_0))$ and $Q = (x_1, f(x_1))$ be two points on the graph of a function $f$. Find a formula for the slope of the chord joining $P$ and $Q$. Explain how, by taking the limit as $x_1 \to x_0$, the formula for the derivative of $f$ at $x_0$ is obtained. Do it for $f(x) = x^4$.

3. Use the rules of differentiation to write down the derivatives of the following functions:

   (a) $f(x) = 5x^2 - 6x^{2/3} + 7\sin x$  
   (b) $g(x) = (x^2 + 3)\tan x$  
   (c) $h(x) = \frac{1}{1 + x^2 + x^4}$  
   (d) $k(x) = 1 - \frac{2}{x} + \frac{3}{x^2} - \frac{4}{x^3}$  

4. Suppose that $\alpha$ is an angle in the second (top left) quadrant with $\cos \alpha = -3/5$ and $\beta$ is an angle in the fourth (bottom right) quadrant with $\sin \beta = -12/13$. Calculate the following:

   (a) $\sin \alpha$  
   (b) $\cos \beta$  
   (c) $\sin(\alpha - \beta)$  
   (d) $\cos(\alpha - \beta)$  
   (e) $\tan(\alpha - \beta)$  

5. Suppose that $3\pi/4 < \theta < \pi$ and that $\sin 2\theta = -4/5$. Calculate the following:

   (a) $\sin \theta$,  
   (b) $\cos \theta$.

6. Simplify each of the following expressions, showing all the steps of your argument carefully:

   (a) $\tan x + \cot x - \frac{1}{\sin x \cos x}$,  
   (b) $2\sin 3x \cos 3x \cos 5x - (\cos^2 3x - \sin^2 3x) \sin 5x$.  

Read the instructions about assignments in the study guide.