1S11 (Timoney) sheet 12
[due via **email** by January 14, 2013]

This is an exercise with spreadsheets, to be done using Google Drive spreadsheets and submitted via email to

ma1s11@maths.tcd.ie

Send it from your @tcd.ie account, **attach** your spreadsheet to the email and put your name and student ID in the subject line please.

You should get an automatically generated response to the first email you send to that address. For any subsequent email you won't get the response.

1. The object of this exercise is to tabulate 26 values of a graph $y = f(x)$, equally spaced between $a = 0$ and $a = 2\pi$, and then make a graph.

   The values of a and b should be recorded in cells of your spreadsheet and the formulae should work so that changing a or b will change the tabulated values (and the graph).

   The function $f(x)$ for your spreadsheet should be made out of the first 4 digits of your student id number, using these as coefficients for 1, $\cos x$, $\cos 2x$, ..., $\cos 7x$. Say your id is 12345678. Then take

   $$f(x) = 1 + 2x + 3\sin(x) + 4\cos^2(x)$$

   More generally if your id number is $n_1 n_2 n_3 n_4 n_5 n_6 n_7 n_8$ your $f(x)$ should be

   $$f(x) = n_1 + n_2 x + n_3 \sin(x) + n_4 \cos^2(x)$$

   Here is a way to go about this.

	A	B	C	D	E
1	$a =$	0			
2	$b =$	=2 * pi()			
3	$h =$	=(B2 - B1)/25			
4	x value	y value			
5	=B1	= 1 + 2 * A5 + 3 * sin(A5)			
6	=A5 + B$3	= 1 + 2 * A6 + 3 * sin(A6)			

   If you replace the formula in B5 by the correct one before copying and pasting it to B6, then copy and paste the two cells A6 and B6 into the rows below down to row 30, you will have the right kind of tabulation,

   If you make a graph (chart) from the data of cells A5 to B30, using column A as labels, you should get the right result. (If you format the values in column A (rows 5 to 30) to 2 decimal places you will get a slightly more pleasant looking graph).

   Note that you have to put $\star$ wherever you want multiplication.

2. (You could do this a bit farther down the same spreadsheet.)

   Use the MINVERSE() function to find the inverse of the matrix

   $$\begin{bmatrix} 1 & 2 & 3 \\ 6 & 5 & 4 \\ 7 & 8 & 1 \end{bmatrix}$$

   Use the MMULT() function to find the square of that matrix.

   Put labels in nearby cells so as to indicate what you mean.

3. Put you name and student ID number in cells at the end.

You should save the google document as an EXCEL format file (save on your own computer when ready — Google should save it as you go — you can change the name from "Untitled spreadsheet" online if you want). Call the file you save on your own computer by a name with your last name, like tut12_Smith.xls and *attach it to an email* sent to the address mentioned above.

<div align="center">ma1s11@maths.tcd.ie</div>

Put your name and student ID in the subject line please.

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