4th set of SAS assignments

1. Create density function of a normally distributed variable

i) Create a data set with values of the density function of a normal distribution

$$f(x|\mu,\sigma^2) = \frac{1}{\sigma\sqrt{2\pi}} e^{-1/2[(x-\mu)^2/\sigma^2]}$$

with parameters $\mu = 0.8$ and $\sigma^2 = 0.6$. Therefore, use a do loop in a **data step**.

```
DO x=start TO end BY step;
CALCULATE VALUES OF A NORMAL DENSITY FUNCTION
output;
END;
```

Let x run from -4 to 4 in steps of 0.01. Label the created variable.

ii) Plot the created density function. Label the axis and save the plot as an Encapsulated Postscript (eps). The range of the vertical axis should be from **0 to 0.6 in steps of 0.05**. (Hint: This option goes into the *axis* statement. `order=(min to max by step);`)

iii) We want to keep the maximum of our axis from above flexible, i.e. match it to the maximum of our observations in order to get a nice plot. The following statements create a macro variable that can then be used in the order statement. Try to figure out what these statments do and use the macro variable in your order statement.

```
proc sql;
select max(dist) into :max
from dataset;
quit;


data _null_;
call symput('max',round(&max.,0.1)+0.1);
run;
```

iv) Create values from a standard normal distribution ($\mu = 0$ and $\sigma^2 = 1$) and plot them together with the values from Task (i) into a graph. Use the `symbol` options to create differently coloured lines for the plots.

v) Create a SAS `MACRO` for the steps i) to iii) with the arguments
%`MACRO`(*path*, *dataset*, *startx*, *endx*, *step*, *mu*, *sigma*).
path denotes the path where the .eps graph is written out to, *dataset* is any name for your data set, *startx* (*endx*) are any starting (ending) values for which to compute the density function and *mu* and *sigma* are the parameters of your normal distribution.

vi) Call your macro.