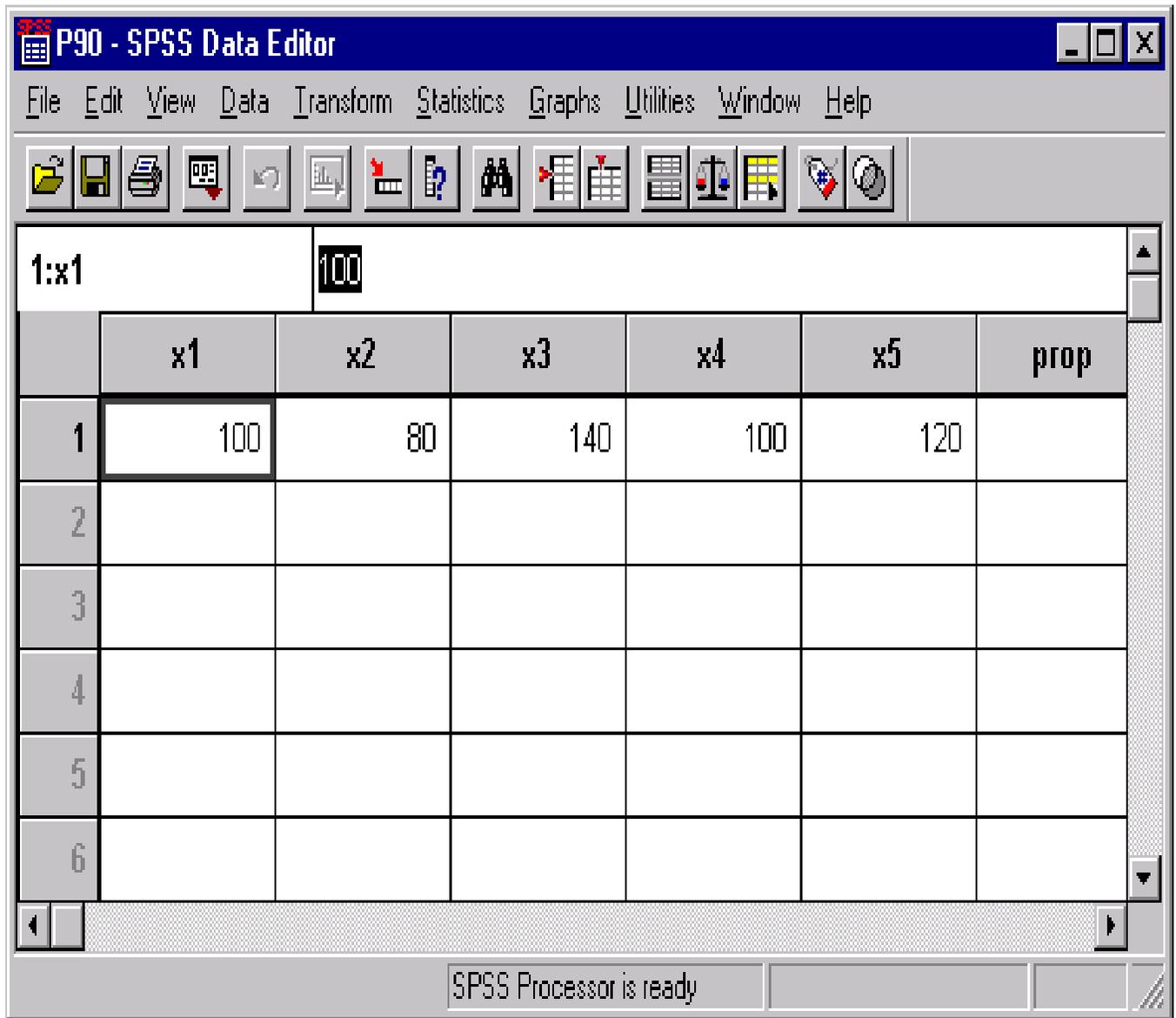


### SPSS Chapter 1 Example 3 – Normal Distribution Probability Calculations

The Wechsler Intelligence Scale for Children (WISC) is normally distributed with  $\mu = 100$  and  $\sigma = 15$ . We would like to know what percent of this population have WISC scores a) below 100? b) Below 80? c) Above 140? and d) Between 100 and 120?

Five variables have been created (i.e., x1, x2, x3, x4, x5). The data have been entered into SPSS and look like the following:



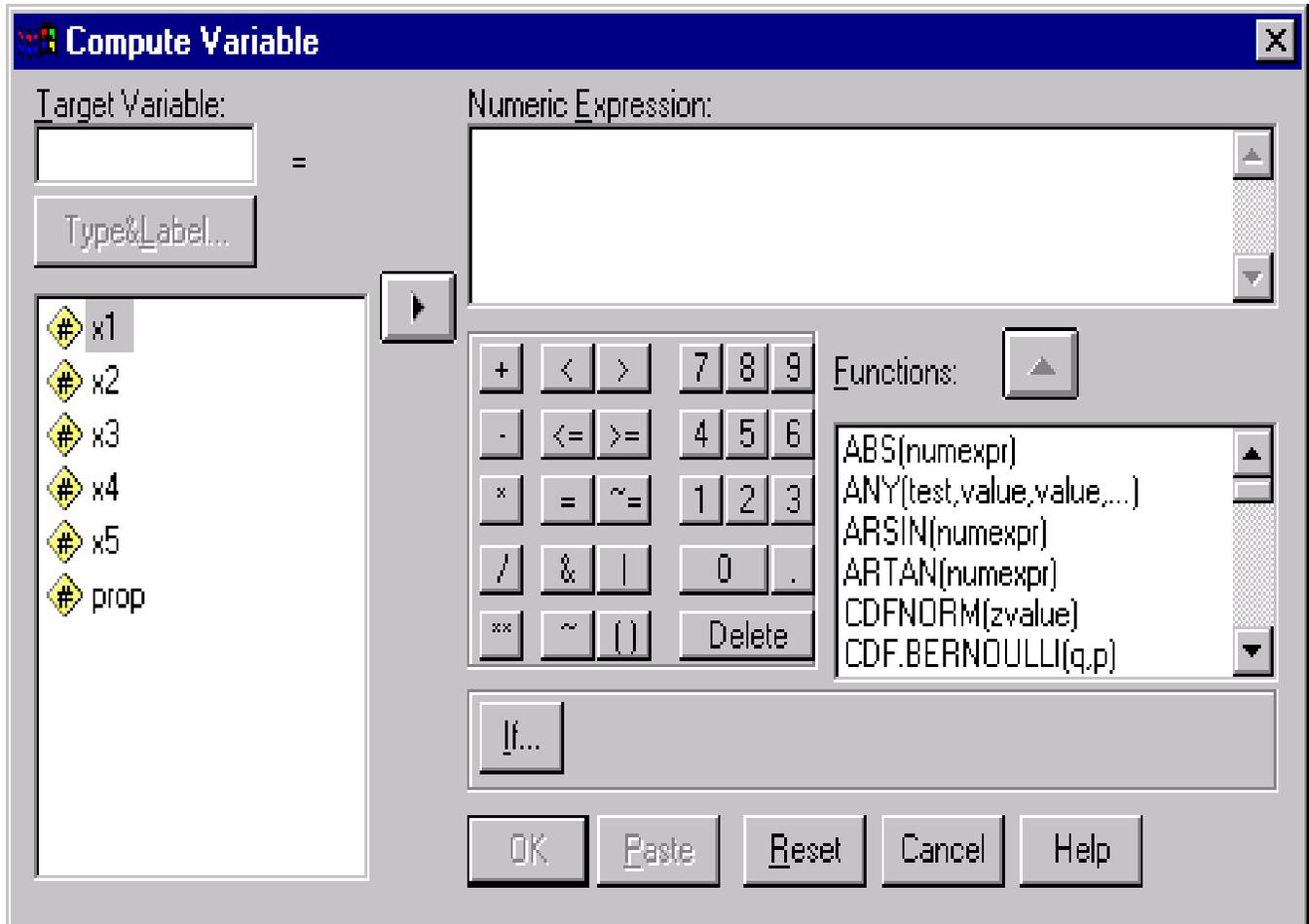
The screenshot shows the SPSS Data Editor window titled "P90 - SPSS Data Editor". The window contains a data table with the following structure:

	x1	x2	x3	x4	x5	prop
1	100	80	140	100	120	
2						
3						
4						
5						
6						

The status bar at the bottom of the window indicates "SPSS Processor is ready".

Follow these steps to perform these calculations:

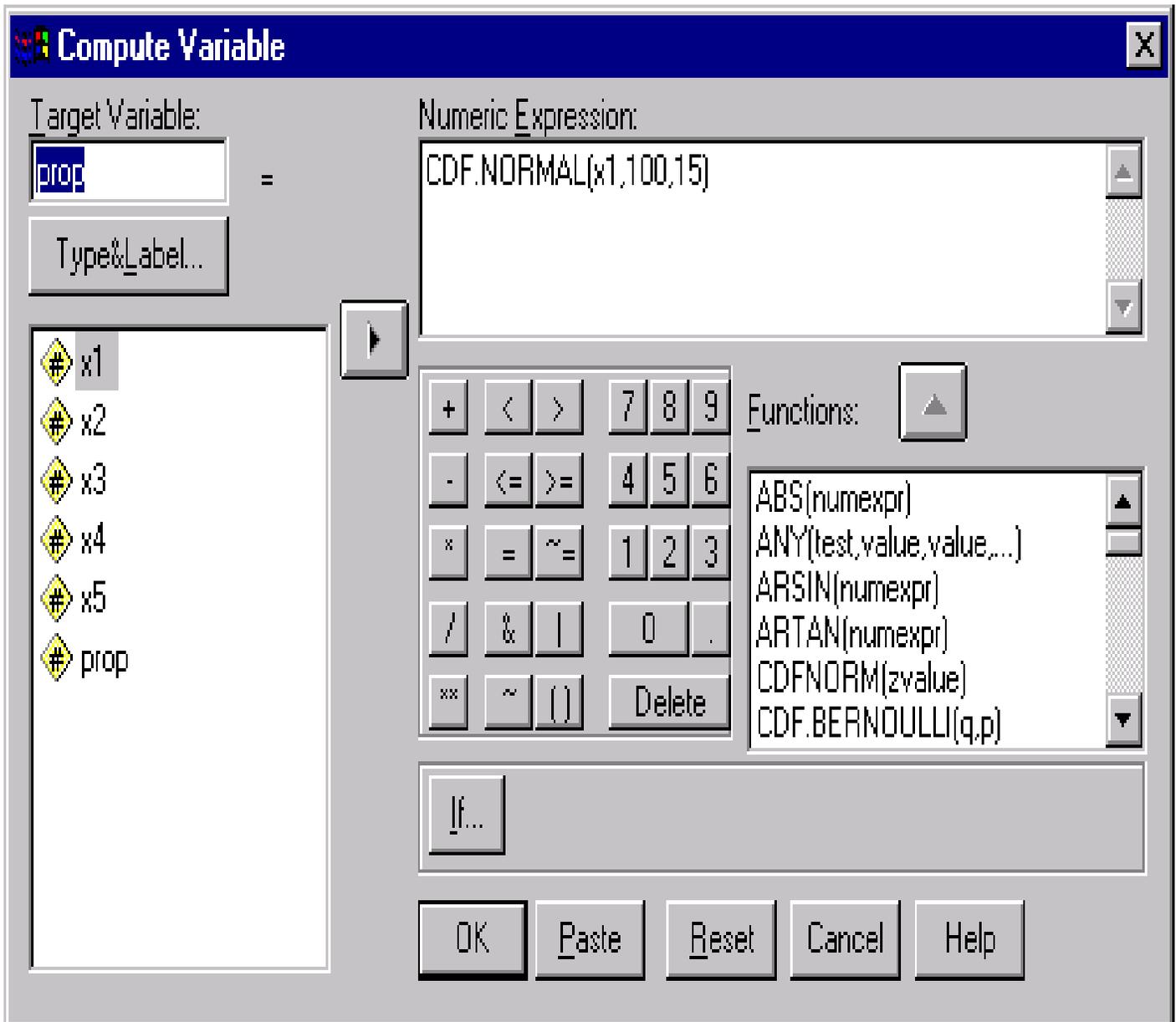
1. Click **Transform** and click **Compute**. The following window will appear.



2. In the box entitled *Target Variable*, type in “**prop**” (short-form for proportion).
3. In the box entitled *Functions*, click the ▼ button until the function entitled **CDF.NORMAL(q, mean, stddev)** appears in the box. Double click on **CDF.NORMAL(q, mean, stddev)** to move this function into the box entitled *Numeric Expression*.

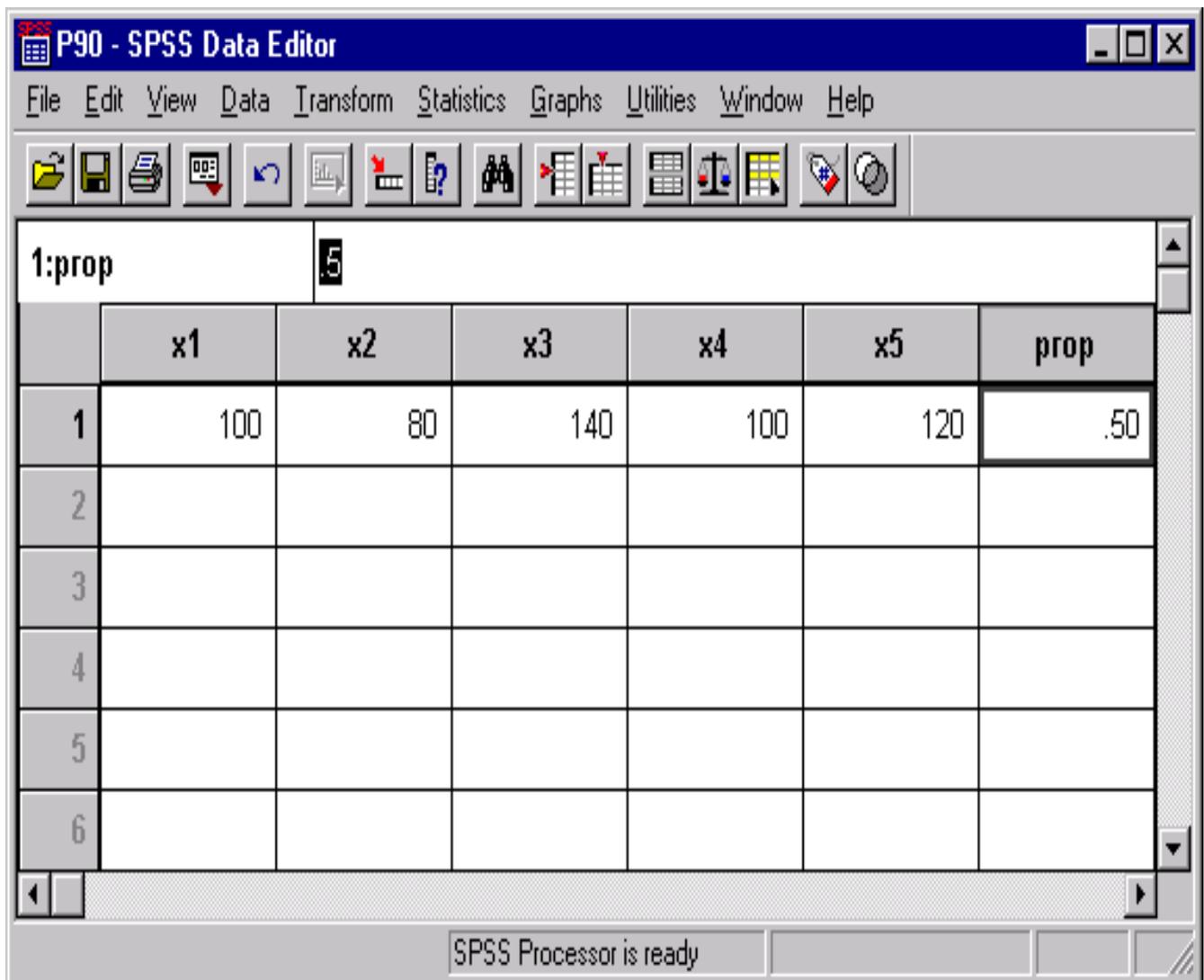
Note: The CDF.NORMAL(q, mean, stddev) function stands for the cumulative distribution function for the normal distribution, and it calculates the area to the left of *q* under the normal curve.

- The `CDF.NORMAL(q, mean, stddev)` function will appear as `CDF.NORMAL(?, ?, ?)` in the *Numeric Expression* box. The variable “**x1**” replaces the `q`, and the population mean and standard deviation are 100 and 15, respectively. Thus the Numeric Expression should appear as “`CDF.NORMAL(x1, 100, 15)`”.



- Click **OK**.

The proportion of population with WISC scores below 100 will appear in the SPSS Data Editor window in the variable entitled *prop*:



The screenshot shows the SPSS Data Editor window titled "P90 - SPSS Data Editor". The window contains a menu bar (File, Edit, View, Data, Transform, Statistics, Graphs, Utilities, Window, Help) and a toolbar with various icons. The main data area displays a table with the following structure:

	x1	x2	x3	x4	x5	prop
1	100	80	140	100	120	.50
2						
3						
4						
5						
6						

The status bar at the bottom of the window indicates "SPSS Processor is ready".

To answer the remaining questions, repeat steps 1-5, but with the following modifications:

The proportion of WISC scores less than 80 will be entered in the *Numeric Expression* box as “**CDF.NORMAL(x2, 100, 15)**”. (Remember that  $x_2=80$ .)

The proportion of WISC scores above 140 will be entered in the *Numeric Expression* box as “**1 - CDF.NORMAL(x3, 100, 15)**”. (Remember that  $x_3=140$ .)

The proportion of WISC scores between 100 and 120 will be entered in the *Numeric Expression* box as “**CDF.NORMAL(x5, 100, 15) - CDF.NORMAL(x4, 100, 15)**”. (Remember that  $x_4=100$  and  $x_5=120$ .)

The proportions of the population will always appear in the SPSS Data Editor window in the variable entitled *prop*.