

Simulations of probability distributions

This option will generate random data which lies on a specified distribution. The standard distributions available are: **Normal**, **Binomial**, **Exponential**, **Integer**, **Uniform real**, **Poisson** or **Discrete (Custom)** which is specified by you in the spreadsheet (see below).

For each you must type in values for the essential parameters which are required to specify the limits of that distribution type, eg for a normal distribution simulation, the mean and standard deviation are needed, such as 0 and 1 respectively in the case of the standard normal distribution (automatically entered).

Steps:

1. Click on the popup menu naming the distribution type (set on **Normal** initially) and select the type you require.
2. Press the **Tab** key to move to the next editable field, and type in the value needed for each distribution parameter. Alternatively you can just click in the editable field you want to alter and type directly. You can request up to 1000 data points for each simulation. Some of the parameters will have upper or lower limits and you will be informed if you exceed these.
3. Choose the **Destination column**, either an existing named column or the next empty column.
4. To initiate the simulation, press the **Return** or **Enter** key, which will activate the **Apply** button, or click this button directly. To dismiss the dialog, click **Cancel** or **Do One** (which does but one simulation then closes the dialog box). Note that you may do several simulations consecutively before leaving. Note that some simulations use longer algorithms than others making the generation of large numbers of data points tedious.

Specific Simulations

The **Normal** simulation requires a mean and standard deviation. Any real values will be accepted for the mean, but the standard deviation must be greater than 0. Note that a useful test of this simulation is to use the **Transform...** option (under the Edit menu) to create another column containing the N scores for this randomly generated list of data. These two columns can then be plotted using the **Scatterplot** option (Extras -> **Plots**) to see how linear the relationship.

The **Binomial** simulation needs the number of trials (**N**) performed and the probability (**p**) of success of the event desired each time.

The **Exponential** simulation needs the mean (μ) only.

The **Integer** simulation requires a range of integers (**min int** to **max int**) within which to choose integer values. Note that even if you type in real numbers, these will be truncated and the root integer values used only. The results will only include integers.

The **Uniform Real** simulation is similar to the Integer simulation, but the values specifying the range are real, and any real number between these limits (**min real** to **max real**) is equally likely to be selected.

The **Poisson** simulation requires the mean value (**lambda**) and the returned numbers will be real.

Discrete or Custom Simulations

You must initially enter the proportions to be associated with each of your categories. If you have 6 categories, which SchoolStat™ will refer to using the integers 1,2,...,6, and want them generated with the respective probabilities 0.1, 0.05, 0.3, 0.15, 0.15, 0.25 then these would need to be entered into one of the columns and given a recognizable title. Note that if the proportions do not add up to 1.0, then this will be noted and the simulation aborted. This option therefore allows you to create unusual distributions for specific purposes.