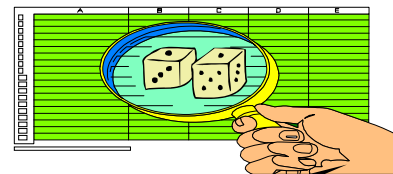




Probabilities With Excel



Nothing in life is certain. Have you ever rolled dice? What determines the outcome when we roll dice?

Well, common dice are nothing more than 6 sided cubes. Each side is numbered from 1-6. If the dice are perfectly balanced, we can expect that any number will come up with each roll.

Probabilities relates to the laws of chance. Because there are 6 sides to a dice, we expect any one number to come up 1 out of 6 times.

Random means that we can expect each expected outcome to occur an equal number of times. In terms of dice, it means that they are balanced and any number is equally likely to result from any roll.

To illustrate the principles of probabilities and random outcomes, we can use Excel to simulate the outcomes of tossing 2 dice. Before we start, let's review some basic spreadsheet concepts.

Formula. A mathematical statement. In Excel it will always begin with the equal (=) sign. Formulas may be constructed with actual numbers or cell references (i.e. A1).

Function. A math statement or formula that is preset in Excel.

RAND. An Excel function that returns an evenly distributed random number greater than or equal to 0 and less than 1.

ROUNDDOWN. An Excel function that rounds a number down towards zero. For example, ROUNDDOWN (3.2,0) rounds to no decimal place and returns the number 3.

Roll the Dice!



Creating a set of "*virtual dice*" in Excel is easy and a great way to review formulas and functions. It also is a practical illustration of random numbers, probabilities, and expected outcomes from a random experiment.

Random Number. A number selected from a known set of numbers in such a way that each number in the set has the same probability of occurrence. It is a number obtained by chance.

Probabilities. The likelihood of something happening in the future. It can be expressed as a proportion or fraction. In the case of dice, each dice has six sides and each side has one of six numbers. The probability of getting a 1 would be 1 out of 6 or 1/6.

Expected Outcome. The result that can be predicted assuming a random (equally likely) probability (likelihood of event).

Virtual Dice in Excel

Our "*virtual dice*" will be based on a simple worksheet in Excel. Here's how it works:

Column A will return a random number between 1 and 0. To generate this number, we will use Excel's RAND function.

Column B will contain a formula to multiply our random number by 6 and add 1. This is the first step to converting our random number (which is between 0 and 1) to a whole number (1, 2, 3, 4, 5, or 6)

Column C complete the conversion to a whole number (1, 2, 3, 4, 5, or 6) by using Excel's ROUNDDOWN function to eliminate any decimal places in our random number and maintain its randomness.

Columns D, E, and F repeat this process for a second dice.

Column G will add the two dice together.

Sound complex? Don't worry; we will lay it out for you to make it easy! Just enter the information, formula, and functions indicated on the next page. Apply **BOLD** where indicated.

For the fills, highlight the range A6: I48 and fill down (**EDIT-FILL-DOWN**). By using Excel's built in functions, we can make complex math simple. After all, isn't that what spreadsheets are all about?

When finished, proofread, **SPELL CHECK**, **SAVE** as **DICE**, and **PRINT**.

