A note on Excel function "RAND( )"

What is a random number generator? In plain language, it is able to generate a series of data which have equal chance to be selected. Such numbers are known as pseudo-random numbers obtained through some mathematical formulae.

The MS Excel® "=RAND( )" function is one of the two commonly used to generate a random decimal number from zero to one in an Excel cell. Another one is "=RANDBETWEEN( )", which generates a random *integer* in the range specified. These random functions are available in all versions of Excel 2016, Excel 2013, Excel 2010, 2007, 2003, XP, and 2000.

In fact, these two Excel random functions generate random numbers from the rectangular or uniform probability distribution where there is equal chance for all values that a random variable can take on. In theory, tossing an even six-faced die for a very large number of times gives an outcome with six possible values (1 to 6) and each of them is equally likely to occur.

It has to be highlighted here that prior to Excel 2003, the random generation algorithm had a rather relatively small period, being less than a million non-recurring random number sequence. It had failed some standard tests of randomness. Since 2007 version, Excel has improved the function which is now widely accepted and fine for many purposes. So, if you are still working on an old Excel version, care must be taken not to use the RAND function with large simulation models.

Applications of RAND( ) function

1. RAND( ) is said to be a "volatile" function because a number random number is always generated each time we perform any action (like updating a formula, editing a cell or enter a new data) on the spreadsheet. To prevent the random numbers generated from changing on every action taken on the spreadsheet, we can initiate a "copy and special paste > value" action.

2. As said before, RAND( ) function has no arguments. It generates a random number between zero and one when we type "=RAND( )" in a cell.

3. We can generate a series of random data by simply copying the first cell with "=RAND( )" function and past it on other cells.

4. To create integer random numbers, we use "INT(RAND( )*N)" to produce a series of integers from zero to a number less than N.

5. If we wish to generate a series of random number with an upper bound value, we can use "=RAND( )*N" which produces a value between zero to any number less than N. e.g., "=RAND( )*100" creates a sequence of numbers 0 to less than 100.

6. If the upper bound requirement is to include 100, we need to use the function "=RAND( )*101", instead.

7. To generate random numbers between Upper (A) and lower (B) bounds, we use "=RAND( )*(A-B)+B". Take note that this random formula does not return a number equal to the largest number (A) of the specified range.

A random number table shown below was generated by using the MS Excel® function "=INT(RAND()*10000).

	A	B	C	D	E	F	G	H	I	J
1	Random Number Table by Excel									
2	4775	9032	8630	1018	2037	5647	5755	2773	6443	5106
3	7505	7072	4794	3234	7075	3373	1706	4330	2834	8088
4	3536	7855	6095	3911	6002	5636	5660	3516	9185	3795
5	1433	6986	6895	4398	4752	7382	3963	2952	4422	1595
6	6525	779	2994	5863	3623	3976	3657	6829	7233	7784
7	8503	8415	5195	7512	137	2240	4104	1709	7615	8479
8	9168	7727	5343	8528	8216	3271	9389	5348	6003	6870
9	7398	717	5549	6775	4049	9997	1813	901	2514	6539
10	2199	9629	3554	2025	33	250	2133	5346	3141	1433
11	3233	6011	6640	1368	8204	5171	865	7302	812	8554
12	5304	5116	3760	6468	3645	4954	150	5675	2607	4435
13	7790	5282	3936	679	379	5022	2152	478	5359	3551
14	5141	9618	5140	7775	7377	8448	2182	5829	42	1449
15	2949	1905	1463	2862	9729	4581	3566	6037	8936	413
16	9314	4383	820	6579	5086	3474	1252	1746	9998	5954
17	6920	6464	5498	4410	5806	7566	6074	5961	1569	3163
18	9944	4499	9948	3613	3921	5402	9301	8242	8444	2762
19	6798	3382	2265	9645	5439	4921	1494	6100	5459	2003
20	1731	3840	7164	8124	2593	2781	9232	5515	1357	1341
21	6212	6457	3515	6768	4166	1443	5550	6543	29	3401
22	8950	4669	8120	2122	8548	2045	3805	8815	4091	1772
23	8739	815	2784	3534	905	6905	6857	1481	4331	7708
24	7176	182	5837	8603	9387	5366	9067	4299	6420	3760
25	8149	1598	9688	5130	4337	4631	7504	7655	2581	1351
26	9872	1216	9798	3763	8215	9940	1600	9814	8371	9000
27										

Sheet1