The CLT, illustrated*

**CLT = Central Limit Theorem*

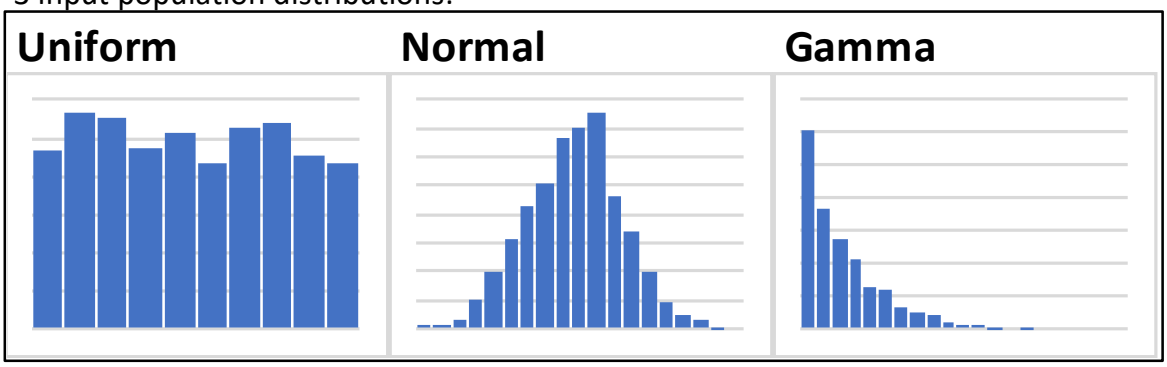
Simply stated:
"Take chunks of ~30 or more from any set, and their averages will often have a normal distribution"

Context

To present to concept to ~50 peers, the Central Limit Theorem sheet was prepared in 30 minutes

Method

3 input population distributions:



2 parameters to sample the populations:

Chunk size
5

Chunks
500

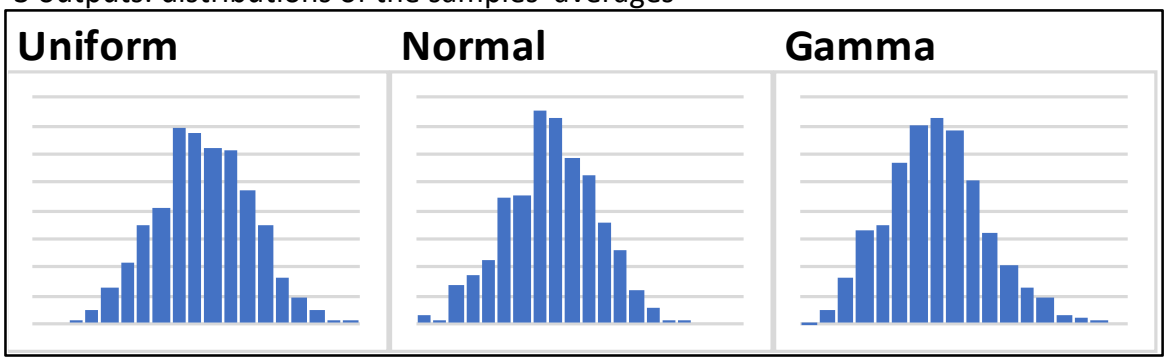
1 formula (hand-derived in a single cell):

```
=LET(
    range, A3#,
    sample_size, $E$4,
    experiment_repeats, $E$5,

    sample_indices, RANDARRAY(sample_size, experiment_repeats, 1,
                    ROWS(range),TRUE),
    sampled_outputs, INDEX(range, sample_indices),

    bycol_sum, TRANSPOSE(MMULT(TRANSPOSE(sampled_outputs),
           SEQUENCE(ROWS(sampled_outputs),, 1, 0))),
     bycol_average, bycol_sum / sample_size,
```

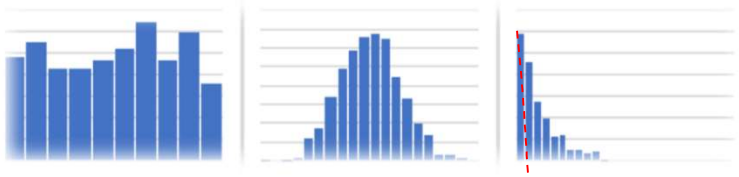
```
TRANSPOSE(bycol_average)
)
```

Note: The third paragraph redefines BYCOL(), because an older version of Excel was used

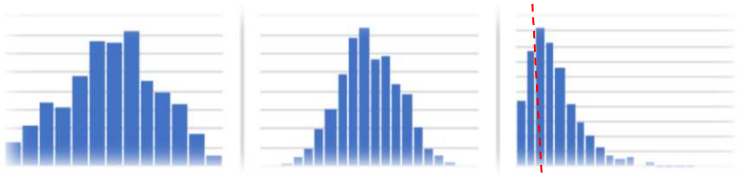
3 outputs: distributions of the samples' averages



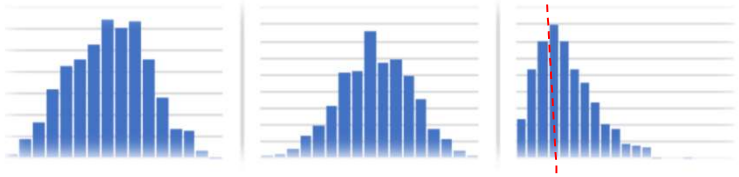
(Try: 1000 Chunks // Chunk sizes 1 through 5 -- illustrated below)



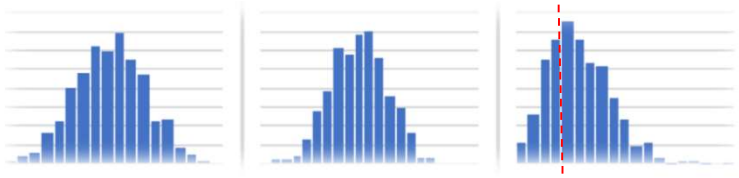
Chunk size	1
# Chunks	1000



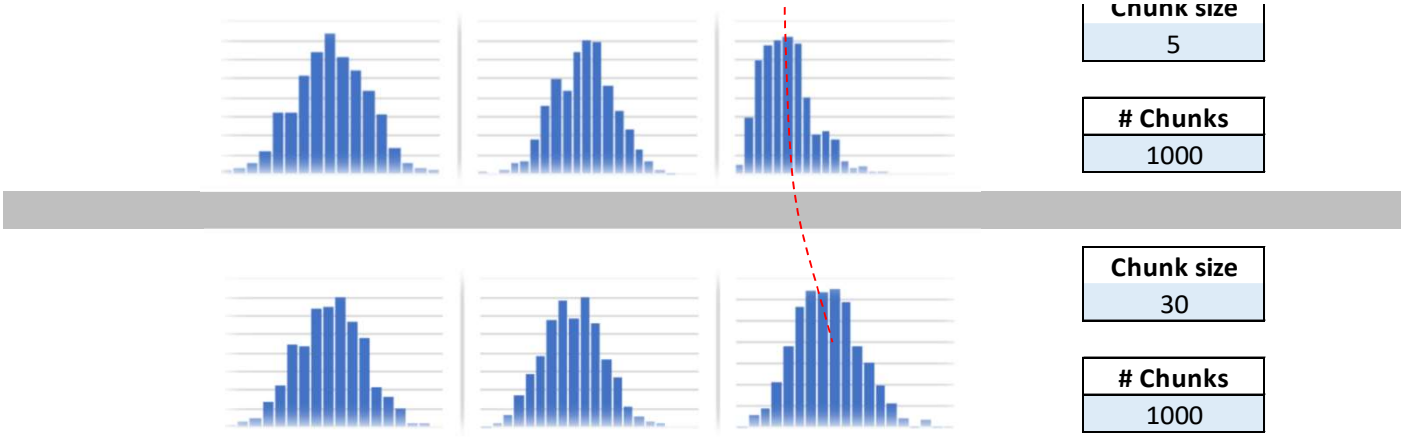
Chunk size	2
# Chunks	1000



Chunk size	3
# Chunks	1000



Chunk size	4
# Chunks	1000



Chunk size
5

Chunks
1000

Chunk size
30

Chunks
1000