

**COSC150: Laboratory 2 (15 February 2022)**  
How do Variances Vary and Deviations Deviate?

**Scientific Investigation of Driving Questions:** Using Excel as your “sand box,” conduct a scientific investigation to shed light on the following driving questions and enter your *result* for each in <https://tinyurl.com/COSC150SharedMeasures> :

Driving Question: Are “Pseudo-Random Numbers (PRN)” random enough for scientific investigations?

What characteristics do you EXPECT PRN’s to have to be “random enough”?

What do you OBSERVE about Excel’s PRN?

Follow Along and do these exercises individually using Excel, but enter your result for each in <https://tinyurl.com/COSC150SharedMeasures> :

- I. What do you expect from RAND()?
  - a. What is the AVERAGE of 10 random numbers (use =RAND() )?
  - b. What is the VARIANCE of 10 random numbers?
  - c. What is the Standard Deviation (use =STDEV) of 10 random numbers?
  - d. What is the STANDARD ERROR (use =STDEV/SQRT(N-1) )
  - e. Are these measures consistent with expectations? Are these consistent if repeated?
  - f. What is the AVERAGE 100 random numbers (use =RAND() )?
  - g. What is the VARIANCE of 100 random numbers?
  - h. What is the Standard Deviation (use =STDEV) of 100 random numbers?
  - i. What is the STANDARD ERROR of 100 random numbers =STDEV/SQRT(N-1)
  - j. Are these measures consistent with expectations? Are these consistent if repeated?
  - k. What is the AVERAGE 1000 random numbers (use =RAND() )?
  - l. What is the VARIANCE of 1000 random numbers?
  - m. What is the Standard Deviation (use =STDEV) of 1000 random numbers?
  - n. What is the STANDARD ERROR of 1000 random numbers =STDEV/SQRT(N-1)
  - o. Are these measures consistent with expectations? Are these consistent if repeated?
- II. What do you expect from simulating a flipped coin?
- III. What do you expect from simulating the roll of a 6-sided dice
- IV. What do you expect from simulating the sum of rolling two 6-sided dice?

By the end of the day Thursday, turn (via e-mail to [panoffrm@wofford.edu](mailto:panoffrm@wofford.edu)) a 2-3 (PDF) page write up of these explorations describing your Expectations, Observations, and Reflections.