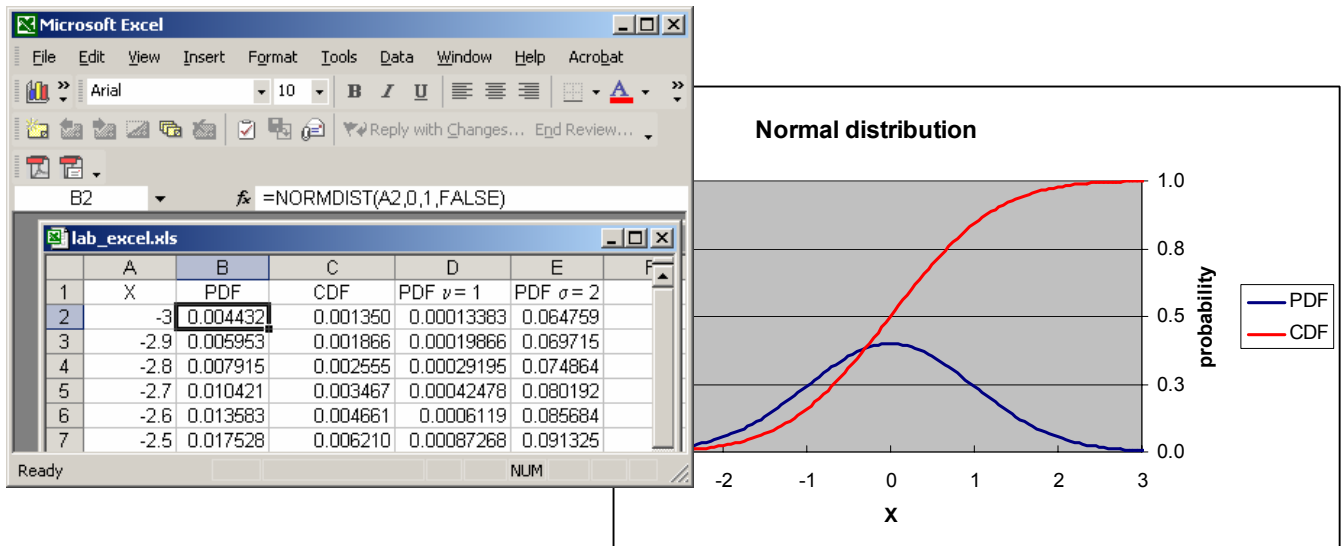


Excel and statistics

Due Feb 28th

Part 1. Normal distribution

1) Using Excel, make a plot of the normal distribution for a mean of zero and a standard deviation of 1. Plot from -3σ to 3σ . Use the normdist function. Setting the last argument as TRUE yields the cumulative probability distribution function; FALSE yields the classic curve. Plot both on the same chart as below. Hint: You will likely want to create a column of numbers spaced at perhaps 0.05 from -3 to 3. There are a couple of ways to do this. One way is to type in by hand. Another is to set cell A2 to the value of 3, then set A3 to $=A2+0.1$ (as an equation). Then copy and paste in that equation for the next 60 or so rows. In column B, type in the equation for normdist using FALSE and referring back to column A for the value of X. Then TRUE for the next one. Plotting them (maybe with a scatter plot) should yield something like this.



2) Now in column D use normdist with a mean of 1, standard deviation of 1 and FALSE. In column E use normdist with a mean of 0, standard deviation of 2, and FALSE. Make a chart.

- What does changing the mean do to the plot?
- What does changing the standard deviation do?
- What is the mathematical relationship between the PDF and the CDF? (hint: the CDF is equal to the area of the PDF as a function of x. The area under the PDF between -3 and 0 is 0.5. The value of the CDF at $x=0$ is 0.5.)
- Can the CDF ever exceed 1.0? Why or why not?

Make a hardcopy of your plots and the answer on one or two pages.

Part 2. The Schmidt Hammer

- **It has a powerful kick and will make marks and chip rocks, etc.**
- **If using the Schmidt Hammer or standing nearby, wear goggles!**
- **Do not use the Schmidt Hammer on anything that will break or deface**



Break into three groups. Each group will make a set of measurements using the Schmidt Hammer and then analyze using our new techniques.

Each group will:

- Make 25 measurements using the Schmidt Hammer (vertical) on the concrete sidewalk.
- Make 25 measurements (vertical) on one of the large granite boulders.
- Make 25 measurements (horizontal) on one of the large granite boulders.
- Make 25 measurements on another large rock type.

Enter your data into Excel and make sure that every one in the group has a copy of the data.

- Calculate the mean and standard deviation of each data set.
- Make plots of the datasets.
- Write a brief lab write-up describing the Schmidt Hammer and what it is commonly used for. Explain the method that we used and shows the plots of the data.
- Find a geology reference that uses a Schmidt Hammer, make a copy and read it. List the reference on your write-up.
- One person from each group should email me a copy of the data in Excel format. Next week we will continue the analysis using data from all the groups.

Hand in

- The plots and answers from part 1.
- A write-up of the Schmidt Hammer lab.