Excel Handout for Math 215

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To Calculate Descriptive Statistics for Given Data

The Descriptive Statistics function of Excel provides information about different data measurements such as: Mean, Median, Mode, Standard Deviation, Sample Variance, Range, Minimum, Maximum, and Count. (Refer to your textbook for full explanation about each of these terms). Therefore, by using the Descriptive Statistics function, which is located under Data Analysis and supplying the correct parameters as in the example below, you should be able to find those measures of central tendency and dispersion.

1. Click the Tools button on the toolbar
2. Choose Data Analysis
3. Select Descriptive Statistics
4. Click Ok.

- Click the Tools button on the toolbar
- Choose Data Analysis
- Select Descriptive Statistics
- Click Ok.

5. Select the input range for the data by highlighting the cells with the data you want to use.
6. Select the output range by highlighting the cell(s) where you want the result to show, as shown in the diagram. (This range can be any empty range in the same sheet or in a different one). You can choose it by clicking in the upper left corner of where you want the results to appear.
7. Check Summary Statistics.
8. Click Ok.

If Data Analysis is not installed, go to Tools, Add Ins, and check Analysis Tool Pack.
This diagram shows the results.
Frequency Distribution and Histograms

In order to create a histogram you will need to create a frequency distribution. Follow the steps below to create a frequency distribution and a histogram for a data set.

1. Click the **Tools** button on the toolbar
2. Choose **Data Analysis**
3. Select **Histogram**
4. Click **Ok**.

5. Select the input range for the data by highlighting it.
6. Leave the bin range blank, this way Excel will automatically calculate it.
7. Choose an output range, you can choose cells on the same sheet or on a new sheet.
8. Click Ok

This will give you the frequency distribution. This will form the basis for the histogram. To create the histogram, do the following:

1. Highlight both columns
2. Click on Chart Wizard.
3. Choose Column
4. Click **Next**, here you can make sure that you have selected the correct range.

5. Click **Next**, here you can add titles, labels, etc.
6. Click **Next**. Choose where the chart is going to appear, if you want it on the same sheet, just click Finish and the chart will appear.

Our chart would look somewhat like this:

In a histogram the bars are always touching. In order to minimize the gaps between each one of the bars, do the following:

1. Right Click on one of the bars in the graph and choose **Format Data Series**
2. Next, click on **Options** and set the **Gap Width** to be 0.

So our final graph should look like this:
You now can use the Edit and Copy Graph function to copy your graph into your Word document.

**To Create a Pie Chart**

1. Highlight the bin and frequency columns mentioned above.
2. Click on the Chart Wizard and choose pie.
3. Click **Next**, make sure that you have the correct range highlighted. You can set the series and category labels which are found under the **Series** tab.
4. Click Next, here you can set titles, labels, and legend.

5. Click Next, and then Finish.
6. The final chart looks like this:
To Calculate the Quartiles (Q1, Median, and Q3)

Quartiles help you to visualize the shape of the data set. The quartiles divide the ordered data into four parts with the same number of data pieces in each part. Use the **Quartile** function found under **Statistical** category within the function menu.

Click the $fx$ icon (insert function).
1. Begin in the cell where you want the answer to appear.
2. Choose the **Statistical** category from the menu.
3. And then click **Quartile**
4. Choose the data range in the **Array** Field by highlighting the cells with the data.
5. Choose the **Quart** by typing 0 for minimum value, 1 for Q1, 2 for Median, 3 for Q3, and 4 for Maximum value.

The first quartile value is 268.5
**To Generate Random Numbers**

Random numbers are often used to select a random sample. For example, you might be asked to choose a sample of 30 out of a population of 100.

One way to do this is to generate a list of 100 random numbers next to the original 100 pieces of data and then to sort both columns by the random number column. Finally, you may choose the first 30.

You can use the `rand()` function. It is found under Math and Trig category.

![Image of Excel spreadsheet with random numbers](image1)

This is my original list that contains 100 numbers.

To generate random numbers, we use the “`rand()`” function and copy it down the column.

![Image of Excel spreadsheet with random numbers](image2)

The `rand()` function has been used in column B
Next, sort the data by the random number. Highlight both the columns with the data and with the random numbers. Then select Data and select Sort. Choose sort by Random (the name of the random number column) and click Ok.

Finally, the first 30 items from your original list would be the randomly chosen sample of size 30.

To Calculate Binomial Probability Distribution

To find the area under the graph that represents the binomial probability you need to know three variables, these variables are:

- **n**: The number of trials.
- **x**: The number of successes.
- **p**: The probability of success on each trial.

For example, suppose that you know that a distribution is binomial with \( n = 5 \) and \( p = 0.3 \), and you want to determine the following probabilities.

1. \( P(x = 0) \)
2. \( P(x \leq 1) \)
3. \( P(x \geq 3) \)

Use the function wizard and choose **BINOMDIST** from the statistical category.
Then do the following:

**Case one: P(x = 0)**
1. Enter the value of 0 for **Number-s**
2. Enter the value of 5 for **Trials**.
3. Enter the value of 0.3 for **Probability**
4. Set the last parameter which is **Cumulative** to be **False**. Since we need the single value of the distribution at x = 0, it is not cumulative.

**Case two: P(X ≤ 1)**
1. Enter the value of 1 for **Number-s**.
2. Enter the value of 5 for **Trials**.
3. Enter the value of 0.3 for **Probability**.
4. Set the last parameter which is **Cumulative** to be **True**, since it asked for the cumulative value of the probability (everything up to x = 1).

**Case three: P(X ≥ 3)**
This case is a little bit different. Excel’s cumulative always does _less than or equal to_ , so since we want values above a certain number, we will need to subtract Excel’s calculation from the number 1. Here you need to find the opposite probability (x<3) and subtract that value from 1 to get the needed probability. For example to calculate x≥ 3, do the following:

In the Excel cell, type in “=1-“ then go to paste function and choose **BINOMDIST**
1. Enter the value of 2 for **Number-s**
2. Enter the value of 5 for **Trials**
3. Enter the value of 0.3 for **Probability**.
4. Set the last parameter which is **Cumulative** to be **True**. This way we will subtract everything below 3 (2 or less) from 1 to get the probability x≥ 3.
To Calculate Normal Probability Distribution

To find the area under the graph that represents the normal probability we need to know three variables, these variables are:

- Sample/Population Mean.
- Sample/Population Standard Deviation.
- X: the value of a particular observation

For example, suppose that a distribution is normal with a mean of 75, and a standard deviation of 10. Find out the following probabilities:

1. \( P(x < 55) \)
2. \( P(x > 66) \)
3. \( P(x \text{ is between } 65 \text{ and } 77) \)

To calculate each of those probabilities, we need to use the NORMDIST function, which is under statistics in the function wizard.
Case one: \( P(X < 55) \)
1. Enter 55 for \( X \)
2. Enter 75 for Mean.
3. Enter 10 for Standard Deviation.
4. You will always set the Cumulative Parameter to be True

Case two: \( P(X > 66) \)
For this one, you will need to determine the \( P(x \leq 66) \) and subtract the result from 1 to get the probability of \( x > 66 \).
1. In the cell where the results will appear type: =1-. Then, select functions and use the NORMDIST to enter the following values:
2. Enter 66 for X
3. Enter 75 for Mean.
4. Enter 10 for Standard Deviation.
5. Set the Cumulative Parameter to be True

sometimes a problem asks you to calculate the area or probability (notice that these two words are used interchangeably to mean the same thing) between two values; therefore you have to calculate the 2 areas and subtract them from each other.

Case three: P (65 < x < 77)
For this one you need to subtract one from the other. That is; subtract the result of: P(x < 65) from P(x < 77). From the cell where you want the answer, calculate the normal probability for P(x < 77). Then go to the formula bar and type in “-“ (minus sign). Next, calculate the normal probability for P(x < 65).