Commonly Used Statcrunch Functions

PALM BEACH STATE COLLEGE

To Find	Go To
Mean, Median, Mode, Standard deviation, Variance, Percentile and Descriptive statistics	Stat → Summary Stats → Columns
Box Plot and 5-number summary	Graph → Boxplot → Select appropriate column under Select Column(s)and Other options select Draw boxes horizontally.
Create **Frequency Distribution with Raw Data** Construct **Frequency Histogram with Raw Data**	Stat → Tables → Frequency →Select appropriate data column and under Statistic(s) select Frequency and click Compute. Graph → Histogram → Select the Column with the Data and under Type select Frequency can leave everything else as defaulted unless you want a particular width and Compute.
Z-Score/ Critical Z Value/Probability/Percentage/Area (Normal Distribution)	Stat → Calculators → Normal
Critical-t (T- Distribution)	Stat → Calculators → T
Probability Distribution (finding mean/standard deviation)	Stat → Calculators → Custom
Binomial Distribution (finding probabilities)	Stat → Calculators → Binomial
Confidence Interval/Hypothesis Testing	Stat → Select the appropriate stats (Proportion Stats/Z Stats/T Stats/ Variance stat) → Select appropriate sample (one or two) and proceed according to the given data or summary. Check Detailed Reference Ch 7/8/9**
Linear Regression (finding r, regression equation and graph when data is given)	Stat → Regression → Simple Linear → Select X Variable and Y Variable, Perform Hypothesis Test (give the null, alternate and confidence level) if graph is needed select Fitted line plot under graph and Compute
Goodness-of-fit (finding $\chi 2$ **and p-value**) **Critical** $\chi 2$	Stat → Goodness-of-fit → Chi Square Test Stat → Calculators → Chi-Square
Sample Size	Refer Detailed Reference (Ch 7) **

** Detailed Reference

Chapter 1-3

- **How to find Mean, Median, Mode, Standard Deviation, Variance and Descriptive Statistics using StatCrunch**
    - **Open/Input data in StatCrunch and click → Stat → Summary Stats → Columns →Under Select columns click the column that has the needed data → Select statistics (mean, variance, etc….for multiple selections you can press CTRL and click), → Click Compute.**
    - **If you need more percentiles, under Percentile type in the needed percentiles separated by commas (30, 67..)**

- **Quick Box and whisker plot and 5-number summary using StatCrunch (without descriptive summary)**
    - **Open data in StatCrunch or Copy/Export Data → GRAPH → Boxplot → Under Select column(s) click the column that has the data→ under Other options select boxes horizontally and → Click Compute.**
    - **To get the 5-number summary, hover over the boxplot**

- **Create a Frequency Distribution with Raw Data**
    - **Open data in StatCrunch or Copy/Export Data →Stat → Tables → Frequency → under Select column(s) select the appropriate Data column and under Statistic(s) select Frequency and click Compute.**

- **Construct Frequency Histogram with Raw Data**
    - **Open data in StatCrunch or Copy/Export Data →Graph → Histogram → under Select column(s) select the column with Data and under Type select Frequency, leave the rest with default values (if specific width,etc. aren't needed), click Compute.**

• **Construct Frequency Histogram with Summary (with a given Frequency Table)** - We will do a **bar graph** to obtain the shape of the histogram; a bar graph without the gaps will be the histogram.

- **Open data in StatCrunch or Copy/Export Data → Graph → Bar Plot → With Summary then under Categories in select the column with Data (class column) and under Counts in select the column that has the frequency; then under Type select Frequency, and under Order by select Worksheet. If you wish to have labels for your axis, go to Graph properties and you can give the label names you wish under X-axis label and Y-axis label;rest of the items could be left with default values and, click Compute.**

Chapter 5 (Probability Distribution/Binomial Distribution)

• **Finding Mean and Standard Deviation of a Discrete Probability Distribution using StatCrunch**

- **Open data in StatCrunch or Copy Data → STAT → Calculators → Custom → For Values select the x-value column, and for Weights select the P(x) value column → Click Compute.**

- **You can also find the required probability like P(x ≤ 5)**

• **How to Solve Binomial Distribution Probability Problems using StatCrunch**

- **STAT → Calculators → Binomial → When the calculator comes up, under Standard, input the n, p, and the appropriate x-value and select the correct inequality/equal sign to whatever probability is being asked for (Example: less than P (x < 5) , greater than P (x > 5), exactly P (x = 5), at least P (x ≥ 5) , at most P (x ≤ 5)) and click Compute.**

Note: You can also calculate probability 'between' two numbers by choosing Between in the binomial calculator (Example: P (2 ≤ x ≤ 4)).

Chapter 6 (Normal Distribution/ T-Distribution)

- **Finding z-scores, Probabilities, and Percentiles with StatCrunch**
  - **Open StatCrunch → STAT → Calculators → Normal**
  - **When the calculator comes up, you can enter the mean, standard deviation and find the probability by selecting the x-value accordingly (for example P(x ≤ 74), P (x ≥ 520) …etc) and click Compute.**
  - **To find the corresponding z-score for x = 74, highlight and copy (Ctrl C) the probability that you found from the above step, change the mean to zero, standard deviation to one, and paste (Ctrl V) the copied probability after the equal sign, and click Compute.**
  - **If you want to find the area (probability) between two values, make sure to change to 'Between' button under the normal calculator so you can enter the given two values P (68 ≤ x ≤ 107).**
  - **If you wish to find P35, for the given mean 100 and standard deviation 12; input the probability as 0.35 after the equal sign, enter the mean and standard deviation and click Compute.**

- **Finding Critical- t using StatCrunch**
  - **Open StatCrunch → STAT → Calculators → T , when the calculator comes up, under Standard, input the appropriate degree of freedom for DF and input the given alpha (α) after the equal sign, then if it is left tail select less than or equal to (≤) and if it is right tail select greater than or equal to (≥) and click Compute.**

- **Finding Critical-Z using StatCrunch**
  - **Open StatCrunch → STAT → Calculators → Normal, when the calculator comes up under Standard, input the mean as 0 and standard deviation as 1, input the given alpha (α) after the equal sign, then if it is left tail select less than or equal to (≤)and if it is right tail select greater than or equal to (≥) and click Compute.**

Chapter 7 (Finding Sample size and Confidence Interval)

- **Confidence Interval for Population Proportion using StatCrunch**
  - **One Proportion (when Summary is given),**
    - **STAT → Proportion Stats → One Sample → With Summary**

      Fill in # of successes (x), # of observations (n), select Confidence Interval for p, enter the Level, and click Compute.
  - **One Proportion (with Raw Data),**
    - **STAT → Proportion Stats → One Sample → With Data**

      under Values in, choose the column by clicking on the column name, under Success define outcome of interest (type the label name just as it appears in the data table),

      under Perform, select Confidence Interval for p, enter the Level, and click Compute.
      (Where and Group by could be left with the default (optional)).

      Note: You could have also created a frequency table (Stat → Tables →Frequency) and obtained the summary; then could have chosen the option With Summary instead of With Data.
  - **Two Proportion (Difference in Proportion) when Summary is given,**
    - **STAT → Proportion Stats → Two Sample → With Summary**

      Fill in # of successes (x), # of observations (n), for both Sample 1 and Sample 2, under Perform select Confidence Interval for p, enter the Level and click Compute.

- **Confidence Interval for Mean using t-Distribution**
  - **When Statistics (Summary) is given,**
    - **STAT → T Stats → One Sample → With Summary → Fill in sample mean, sample standard deviation, sample size, under Perform, select Confidence interval for μ, enter the Level and click Compute.**
  - **When Data is given,**
    - **Open Data in StatCrunch → STAT → T Stats → One Sample With Data → Select the column by clicking on the column name, then under Perform select Confidence interval for μ,**

enter the Level and click Compute.

- **Note:** When you have two samples (mean difference) you will follow the above but will select Two Sample instead of One Sample,and input the information accordingly for Sample1and Sample2. Important point to note is you leave the Pool variances unchecked (it will be checked only for equal variances), default is unchecked, so leave it as it is).

• Confidence Interval for Mean using Normal (Z) Distribution (population standard deviation σ is known)

- When Statistics (Summary) is given,
  - STAT → Z Stats → One Sample → With Summary → Fill in sample mean, standard deviation, sample size, then under Perform, select the Confidence interval for μ, and enter the Level and click Compute.

- When Data is given,
  - Open Data in StatCrunch → STAT → Z Stats → One Sample With Data → Select the column by clicking on the column name then enter the population standard deviation, under Perform, select Confidence interval for μ, enter the Level and click Compute.

- **Note:** When you have two samples you will follow the above steps but will select Two Sample instead of One Sample and input the given information accordingly for Sample 1 and Sample 2.

• Confidence Interval for Paired Sample Mean Difference using StatCrunch

- Open Data in StatCrunch → STAT → T Stats → Paired → Select the appropriate columns for Sample 1 and Sample 2, no need to change Where and Group by options, under Perform select Confidence interval for μ_D (mean difference), enter the Level and click Compute.

`• Finding the Sample Size when Population Standard Deviation σ and Error are given

- STAT → Z Stats → One Sample →Width/Sample Size → Input Confidence level, Population Standard Deviation, Width (2*Margin of Error), and click Compute.

- **Finding the Sample Size when Proportion is known**

  - **STAT → Proportion Stats → One Sample →Width/Sample Size Input Confidence level, Target proportion (known/given proportion p), Width (2*Margin of Error), and click Compute.**

- **Finding the Sample Size when Proportion is NOT known**

  - **STAT → Proportion Stats → One Sample →Width/Sample Size → Input Confidence level, Target proportion as 0.5, Width (2*Margin of Error), and click Compute.**

Chapter 8/9 (Pooled variance unchecked)

- **Hypothesis Testing for Population Proportion using StatCrunch**

  - **One Proportion (when statistics is given),**
    - **STAT → Proportion Stats → One Sample → With Summary → Fill in # of successes (x), # of observations (n), under Perform select Hypothesis test for p, fill in the null H_0 and alternate hypothesis H_A and click Compute.**

  - **One Proportion (with Raw Data),**
    - **STAT → Proportion Stats → One Sample → With Data under Values in, choose the column by clicking on the column name, under Success define outcome of interest (type the label name just as it appears in the data table), under Perform, select Hypothesis test for p,fill in the null H_0 and alternate hypothesis H_A and click Compute. (Where and Group by could be left with the default (optional).**

      Note: You could have also created a frequency table (Stat → Tables →Frequency) and obtained the summary; then could have chosen the option With Summary instead of 'With Data'.

  - **Two Proportion (Difference in Proportion) when statistics is given,**
    - **STAT → Proportion Stats → Two Sample → With Summary →**

Input # of successes (x), # of observations (n), for both Sample 1 and Sample 2, under Perform, select Hypothesis test for p, fill in the null H_0 and alternate hypothesis H_A and click Compute.

- **Hypothesis Testing for Mean using t-Distribution**

  - When Statistics (Summary) is given,
    - STAT → T Stats → One Sample → With Summary → Fill in sample mean, sample standard deviation, sample size, and select Hypothesis test for μ, fill in the null H_0 and alternate hypothesis H_A and click Compute.

  - When Data is given,
    - Open Data in StatCrunch → STAT → T Stats → One Sample → With Data → Select the column by clicking on the column name, and select Hypothesis test for μ,fill in the null H_0 and alternate H_A hypothesis, click Compute.

  - Note: When you have two samples (mean difference) you will follow the above but will select Two Sample instead of One Sample and input given information accordingly for Sample 1 and Sample 2.

- **. Hypothesis Testing for Mean using Normal (Z) Distribution (population standard deviation σ is known)**

  - When Statistics (Summary) is given,
    - STAT → Z Stats → One Sample → With Summary → Fill in sample mean, standard deviation, sample size, and select Hypothesis test for μ, fill in the null H_0 and alternate hypothesis H_A and click Compute.

  - When Data is given,
    - Open Data in StatCrunch → STAT → Z Stats → One Sample →With Data → Select the column by clicking on the column name then enter the population standard deviation, and select Hypothesis test for μ, fill in the null H_0 and alternate H_A hypothesis and click Compute.

  - Note: When you have <u>two samples</u> you will follow the above steps but will select 'Two Sample' instead of One Sample and input accordingly for Sample 1 and Sample 2

- **Hypothesis Testing for Paired Sample Mean Difference using StatCrunch**
    - **Open Data in StatCrunch → STAT → T Stats → Paired → Select the appropriate columns for Sample 1 and Sample 2, no need to select Where and Group by options, select hypothesis test for μ_D (mean difference) and fill in the null H_0 and alternate hypothesis H_A and click Compute.**

Chapter 10 (Regression)

- **Finding Correlation Coefficient r, Regression Equation, and graph when data set is given using StatCrunch**
    - **Open/input the data in statcrunch and goto,**
        - **STAT → Regression → Simple Linear → Select the appropriate columns for x Variable and y Variable, select hypothesis test and make sure null (H_0) is zero and alternate (H_A) is not equal to zero, under Graph select Fitted line plot and click Compute.**
    - **Note:**
      If you need to find the predicted y-value for the given x, input the given x-value, under Prediction of Y during the above process.

Chapter 11 (Goodness-Of-Fit)

- **Calculate Chi Square test statistic and p-value with the given data set (one way table) using StatCrunch**
    - **Open/input the data in statcrunch and go to,**
        - **STAT → Goodnes-of-fit → Chi Square Test → Select the appropriate columns for 'Observed' and 'Expected' (if there is no column given with expected distribution or information to calculate expected distribution, we can select "all cells in equal proportion") and click Compute.**

- **Note**:

  If you need to build the "Expected Value column" with the given percentages, go to Data → Compute → Expressions and under Expression click on Build and input the expression to calculate Expected value and click okay. Then label the Column Label: as Expected and click Compute. (This will create the column as per the given expression under the name Expected).

• Calculate Critical Chi Square (χ2) when significance level (α) is given with statcrunch

- **Open Statcrunch and go to ,**
  - **STAT → Calculators → Chi-Square → Input the appropriate Degree of freedom DF, the given significance level α after the equal sign; since χ2 is right tailed test make sure to have greater than or equal selected (≥)and click Compute.**