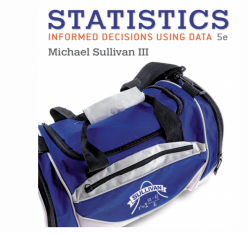
Compiled by Demara Austin, Math Aunty Tutoring and Consulting

My name is Demara Austin, a math teacher and tutor who started Math Aunty Tutoring and Consulting. I compiled this study guide for a student with an exam in a Statistics course using the Pearson Statistics Informed Decisions Using Data 5th edition 5e text book by Michael Sullivan. The first exam for this course was on chapters 1-4, covering topics in random variables, correlation coefficients, mean, standard deviation, lines of best fit, and more. This study guide provides formulas from the summary sections of each chapter in the book as well as instructions for calculating using a TI 84 graphing calculator. If you are interested in tutoring, I can be reached at demara@mathaunty.help and all of my relevant links are here https://linktr.ee/mathaunty.



Statistics: Informed Decisions Using Data with Integrated Review

Cheat Sheet Info and Study Plan for Chapters 1-4

1) **For each chapter, go to the chapter review and look over the Objectives listed. Can you do each action?**
2) **Practice one problem using each of the formulas listed to practice them. Do you know how to find or calculate all of the variables here? (Depending on your instructor, you may need to practice manipulating the equations, using the calculator/technology, or both.**
3) **Do missing homework problems**

Formatting Tips For Cheat Sheet

1) **Write a key and define all variables used in all equations that you write.**
2) **Make sure to include the name of the formula.**
3) **Include keywords to remind yourself how to use the calculator to do these things.**

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Statistics from a List of Numbers

These can be found in 1-Var Stats Menu after entering lists in L1, L2, etc

Formulas

Population Mean

$$\mu = \frac{\sum x_i}{N}$$

Sample Mean

$$\bar{x} = \frac{\sum x_i}{n}$$

Population Standard Deviation

$$\sigma = \sqrt{\frac{\sum (x_i - \mu)^2}{N}} = \sqrt{\frac{\sum x_i^2 - \frac{(\sum x_i)^2}{N}}{N}}$$

Sample Standard Deviation

$$s = \sqrt{\frac{\sum (x_i - \bar{x})^2}{n-1}} = \sqrt{\frac{\sum x_i^2 - \frac{(\sum x_i)^2}{n}}{n-1}}$$

Population Variance

$$\sigma^2$$

Sample Variance

$$s^2$$

Range = Largest Data Value − Smallest Data Value

Weighted Mean

$$\bar{x}_w = \frac{\sum w_i x_i}{\sum w_i}$$

Population Mean from Grouped Data

$$\mu = \frac{\sum x_i f_i}{\sum f_i}$$

Sample Mean from Grouped Data

$$\bar{x} = \frac{\sum x_i f_i}{\sum f_i}$$

Population Standard Deviation from Grouped Data

$$\sigma = \sqrt{\frac{\sum (x_i - \mu)^2 f_i}{\sum f_i}}$$

These can be found in 1-Var Stats Menu after entering lists in L1, L2, etc

Table 9

Score, x_i	Population Mean, μ	Deviation about the Mean, $x_i - \mu$	Squared Deviations about the Mean, $(x_i - \mu)^2$
82	79	$82 - 79 = 3$	$3^2 = 9$
77	79	$77 - 79 = -2$	$(-2)^2 = 4$
90	79	11	121
71	79	−8	64
62	79	−17	289
68	79	−11	121
74	79	−5	25
84	79	5	25
94	79	15	225
88	79	9	81
		$\Sigma(x_i - \mu) = 0$	$\Sigma(x_i - \mu)^2 = 964$

To make this table, put L1 as the X column.
Click 1-Var Stats to find the mean
To calculate the Deviation about the Mean column, Navigate to L2 and set L2 = L1 - Mean
To calculate the Squared Deviations Column, Navigate to L3 and set L3 = L2^2. The sums of the columns can be found in 1-Var Stats.

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Z-Scores and Box Plots

Use calculator to find mean and deviation to calculate z-score. To easily create a table of z-scores, create a list and define the list to be the equation for z-score with the appropriate values plugged in.

Sample Standard Deviation from Grouped Data

$$s = \sqrt{\frac{\Sigma(x_i - \bar{x})^2 f_i}{(\Sigma f_i) - 1}}$$

Population *z*-Score

$$z = \frac{x - \mu}{\sigma}$$

Sample *z*-Score

$$z = \frac{x - \bar{x}}{s}$$

Interquartile Range

$$\text{IQR} = Q_3 - Q_1$$

Lower and Upper Fences

$$\text{Lower Fence} = Q_1 - 1.5(\text{IQR})$$
$$\text{Upper Fence} = Q_3 + 1.5(\text{IQR})$$

Correlation Coefficient

Calculator: STAT CALC 4 LinReg(ax+b where a= slope of line of best fit, b = y-intercept of line of best fit, and r = correlation coefficient.)

Formulas

Correlation Coefficient

$$r = \frac{\Sigma\left(\frac{x_i - \bar{x}}{s_x}\right)\left(\frac{y_i - \bar{y}}{s_y}\right)}{n - 1}$$

Equation of the Least-Squares Regression Line

$$\hat{y} = b_1 x + b_0$$

where

$\hat{y}$ is the predicted value of the response variable

$b_1 = r \cdot \frac{s_y}{s_x}$ is the slope of the least-squares regression line

$b_0 = \bar{y} - b_1 \bar{x}$ is the y-intercept of the least-squares regression line

Coefficient of Determination, R^2

$$R^2 = \frac{\text{explained variation}}{\text{total variation}}$$
$$= 1 - \frac{\text{unexplained variation}}{\text{total variation}}$$
$$= r^2 \text{ for the least-squares regression model } \hat{y} = b_1 x + b_0$$

Correlation Coefficient Value (r)	Direction and Strength of Correlation
-1	Perfectly negative
-0.8	Strongly negative
-0.5	Moderately negative
-0.2	Weakly negative
0	No association
0.2	Weakly positive
0.5	Moderately positive
0.8	Strongly positive
1	Perfectly positive

By hand outline example: https://jamboard.google.com/d/14ZjCpJvM2CLjZmTkUIpIGgHDo9IqB6Wy-q5cAHKy34w/edit?usp=sharing