

Tutorial 2

Objectives: you learn how to:

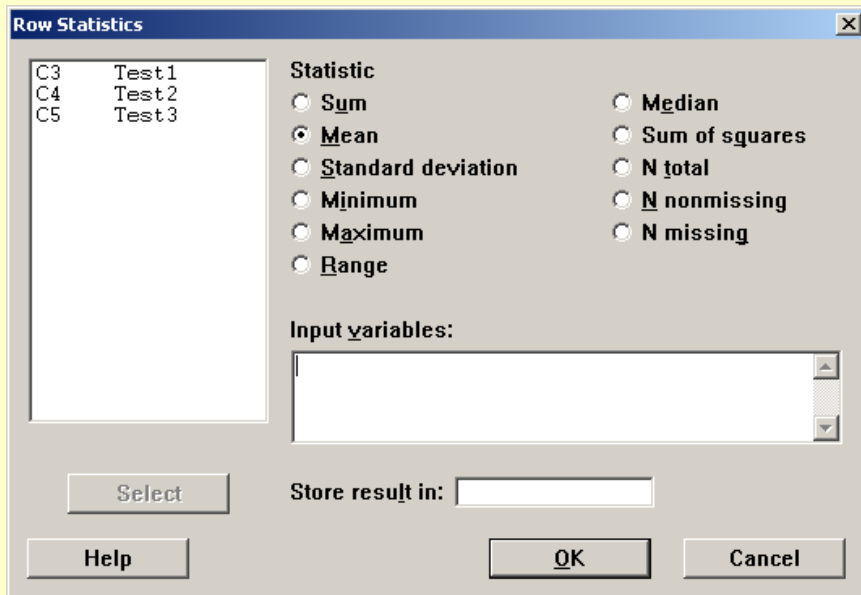
- work with data in the Session window
- summarize rows (individual cases) and columns (variables)
- combine and breakdown columns of data code, rank, and sort data
- standardize data from different variables in order to compare them view and print data

CASE STUDY: EDUCATION – CLASS EVALUATION

You have just completed your first marking period as a social studies teacher. You entered your students' grades for the first three tests into a Minitab worksheet. Your principal, Ms. Taylor, would like you to prepare a report about your students' progress.

You want to compute each student's average grade for the three exams. You could, of course, add each student's test grades in the third, fourth, and fifth columns of the appropriate row, divide by three using a calculator, and then enter the results in a column. Instead, you can use a single Minitab command to compute each student's average test score.

- Start Minitab and open the MARKS.MTW *worksheet*. Locate this file in **C:Program Files/ MTBWIN / Student9**
- Save this file in your Stat folder
- Create a variable called **Averag** in the variable text box in Calc/Calculator using the expression $(C3+C4+C5)/3$.
- You could do step 2 by selecting Calc/Row Statistics



Click inside the **Input variable** text box and select C3, C4 and C5.
Type RMEAN in **Store result** text box for row mean.

If you compare the entries in C6 and C7, you can see that the two methods produce the same results.

Use the Row Statistics option to compute the median, RMEDIAN, of each row. Store the result in the Store result in the text box.

Save your worksheet in your Stat folder inside the

Document Write up: Include a snapshot of your worksheet and summarize some of the highlights of the RMEAN and RMEDIAN results. When you write this summary, keep in mind the information that is important to mention.

Document name: YI_Tutorial2

NOTE: for a snapshot, press the **Alt** and **Print Scrn** keys at the same time. Open **Paint** from **Accessories (Start/Programs)** to paste the snapshot. Select and copy (**Ctrl c**) only the information needed. Paste your cropped snapshot in your document.

COMBINING DATA WITH THE STACK OPTION

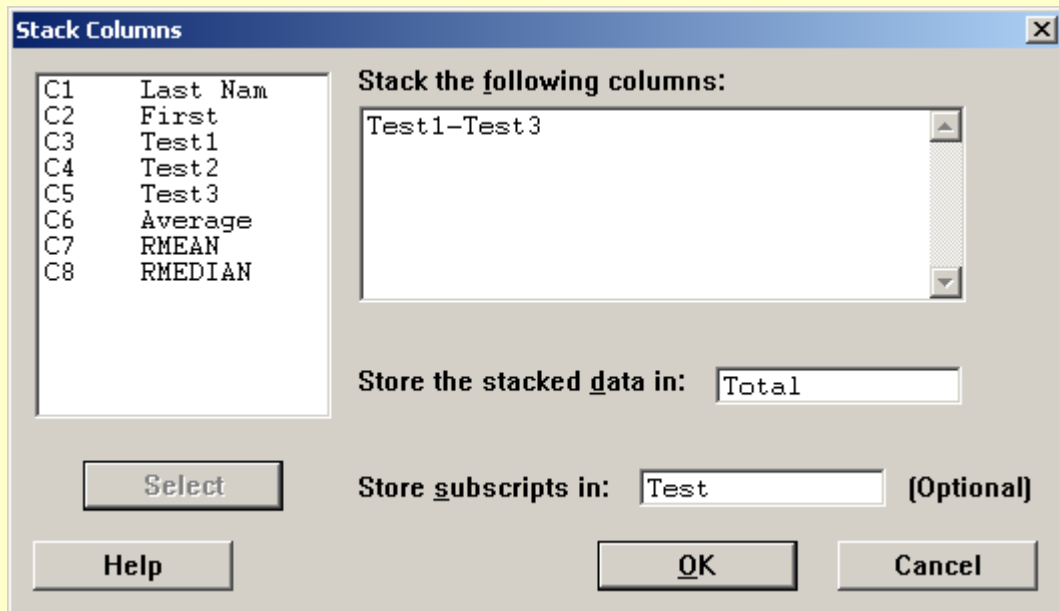
Your principal, Ms. Taylor, has asked you to include statistical information for all three tests in your report. Minitab lets you combine data from several columns into a single column by stacking them on top of each other. This method creates a new variable that consist of data from all the selected columns.

Choose **Manip > Stack / Unstack > Stack Columns**

In the **Stack the following columns** text box select C3-C5

Type Total in the **Store results** in text box.

Type Test in the **Store subscripts** in text box. Press OK. Notice how all the grades are stacked on top of one another, in other words, all three columns are listed in a single vertical column. Note, too that the subscript identifies the test from which each grade originated.

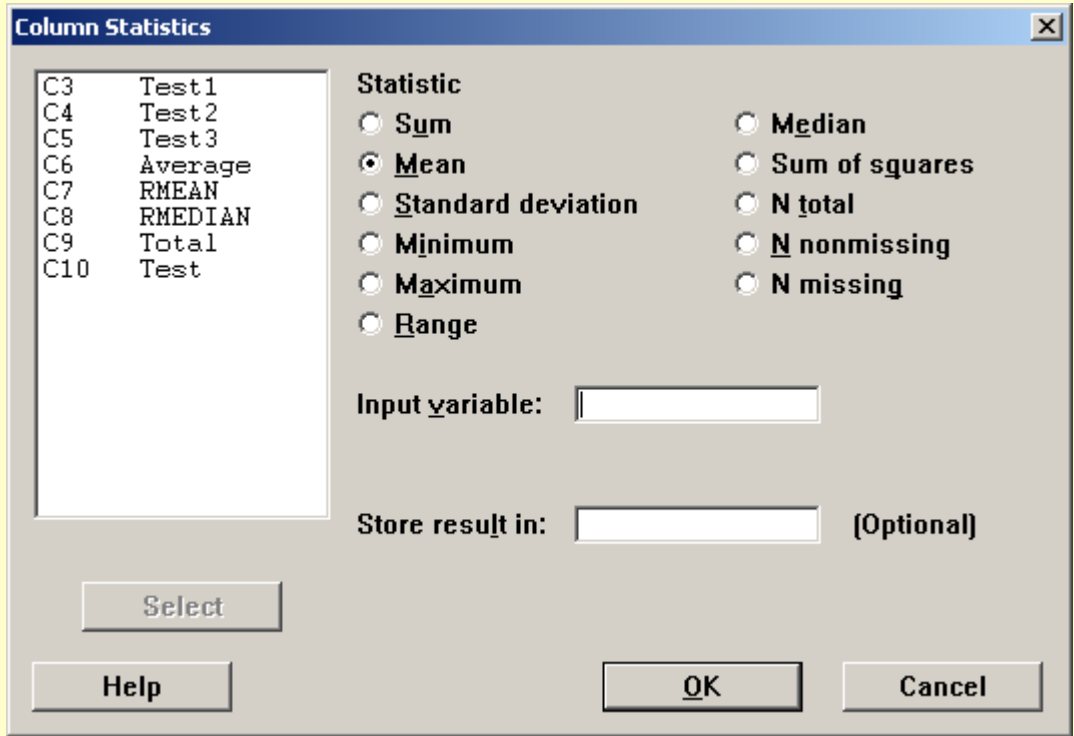


	C1-T	C2-T	C3	C4	C5	C6	C7	C8	C9	C10	C11
↓	Last Nam	First	Test1	Test2	Test3	Average	RMEAN	RMEDIAN	Total	Test	
6	GIGLIOTTI,	ANDREW	78	94	50	74.0000	74.0000	78	78	1	
7	GOLDBERG,	JONATHAN	98	98	94	96.6667	96.6667	98	98	1	
8	GREEN,	JENNIFER	92	91	99	94.0000	94.0000	92	92	1	
9	KENNEDY,	KEVIN	71	78	62	70.3333	70.3333	71	71	1	
10	LEE,	SANG	64	68	97	76.3333	76.3333	68	64	1	
11	MCCLURE,	MARK	49	79	43	57.0000	57.0000	49	49	1	
12	MESSINA,	STEVEN	94	93	95	94.0000	94.0000	94	94	1	

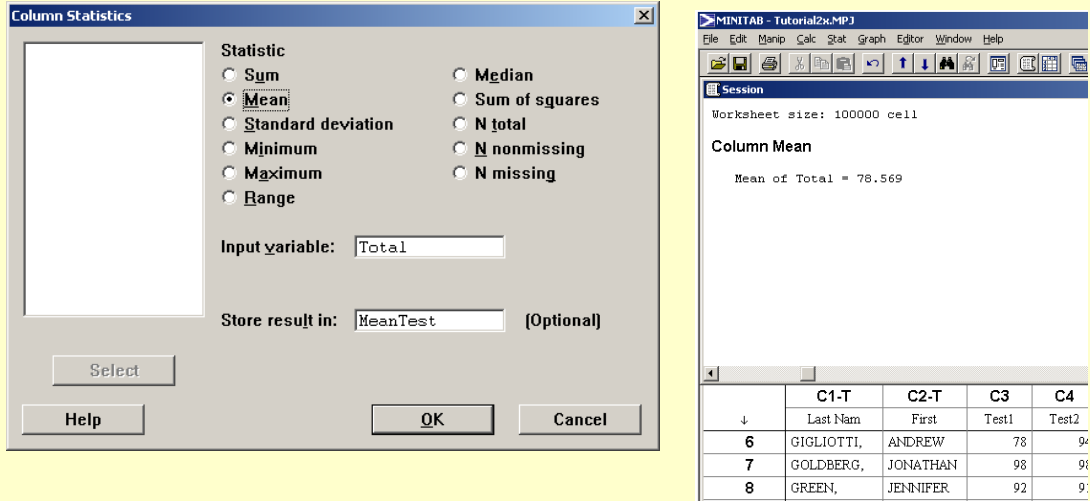
Choose **Calc > Column Statistics** to open the **Column Statistics** dialog box, which contains the selections you made before.

Click inside the **Input Variable** text box and highlight your selection, Mean and Std Dev.

Double-click Total to enter it in the **Input Variable** text box.



Type MeanTest in the **Store results in** text box and the press enter.



Document Write up: Include a snapshot of your worksheet and summarize some of the highlights of the MeanTest results. When you write this summary, keep in mind the information that is important to mention.

The school district where you work uses the letter grades A, B, C, D and F, based on a four-point scale in which 4 = A thru 0 = F. To compute the students' grades, you need to create a new variable based on grade intervals and translate the existing grades to the four point-scale. You want to code grades falling in the interval of 90 to 100 as a 4 (A), grades of 80 to 89 as a 3 (B), grades of 70 to 79 as a 2 (C), grades of 60 to 69 as a 1 (D), and grades 59 and below as a 0 (F).

Code the students' average:

Choose Manip > Code > Numeric to Numeric

Click inside the **Code data form columns** and select RMEAN.

Type GRADE in **Into columns**

In the **Original values** text boxes, enter the grades breakdown

In the **New** text boxes, enter the code value.

Press OK

Original values (eg, 1:4 12):	New:
89.45:100	4
79.45:89.44	3
69.45:79.44	2
59.45:69.44	1
49.45:59.44	0

By scanning the GRADE column, you can quickly determine which students are doing well and which ones need help.

Save your project and worksheet.

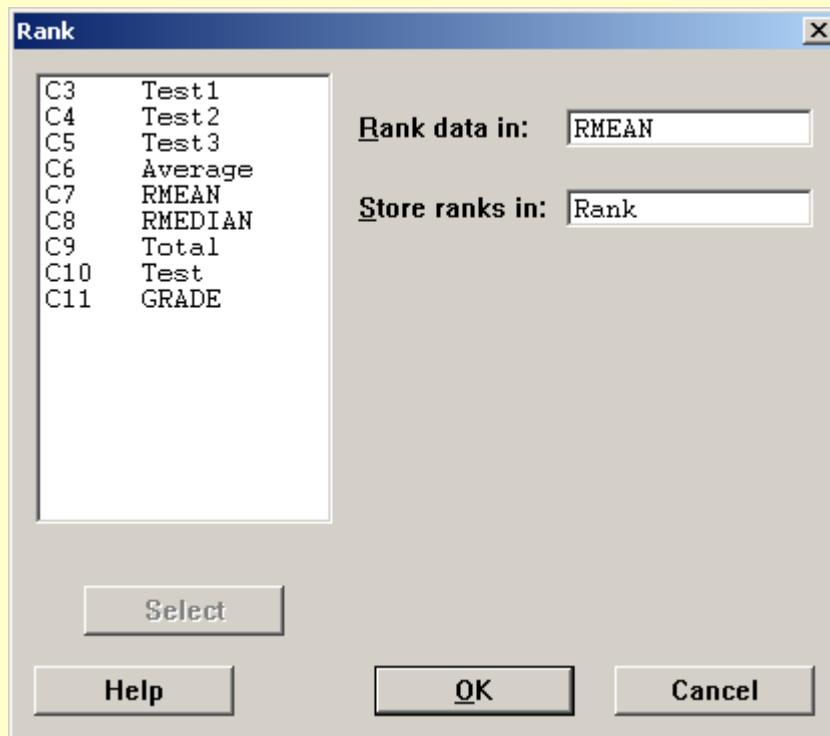
Document Write up: Include a snapshot of your worksheet and summarize some of the highlights of the GRADE column.

Save your document before continuing.

Ms. Taylor ask you to rank your students' average exam scores in numerical order so she can see how each student's performance compares to the rest of the class's. Minitab ranks the data listed in any column by assigning a value of 1 to the lowest score, 2 to the second lowest, and so on. The top student is ranked number 24 because this is the total number of students in the class.

Manip > Rank

Double-click RMEAN to enter it in the **Rank data in** text box.
Type RANK in the **Store ranks in** text box.



Ms. Taylor also wants you to create and print a list of the students ordered by their mean score.

Before you sort data, it's a good idea to save it just in case your data get mixed up.

File > Save Worksheet As

Type **2Marks**

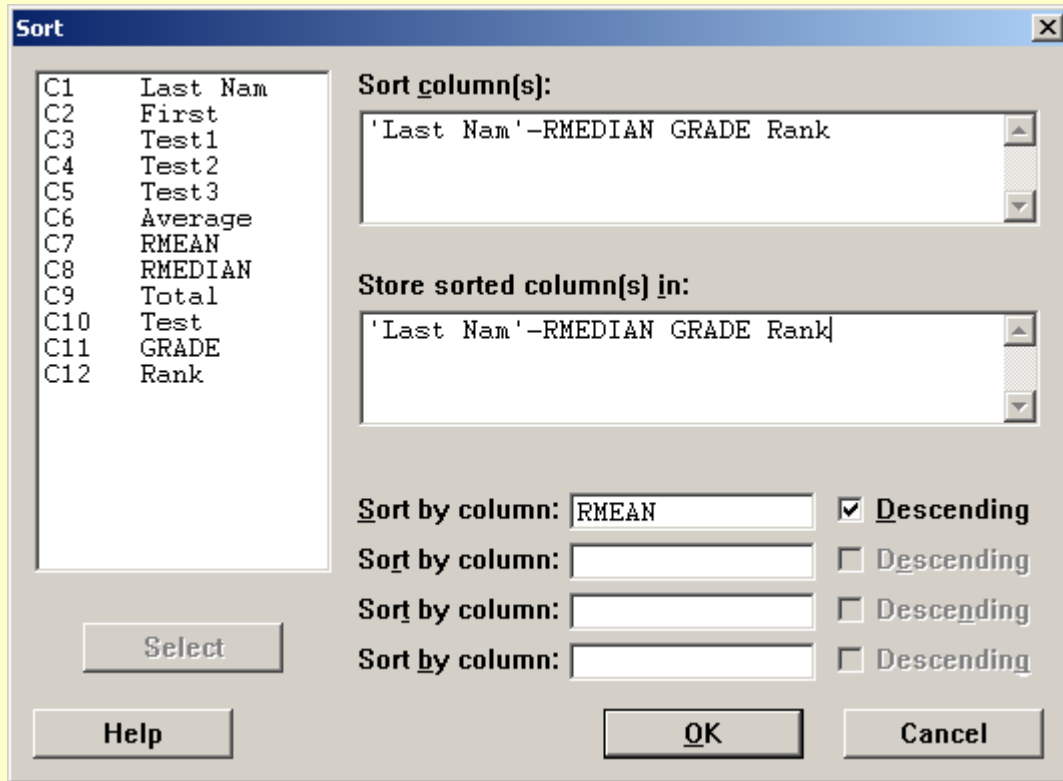
Now you are ready to sort your data by mean test score.

- Choose **Manip > Sort**
- Highlight all the columns in the list box except Test and TOTAL. (**Remember to press Ctrl while you click the individual column names**)
- You don't want to sort these two columns because they contain information about all of the exams for all the students, not a particular row or student.
- Click **Select** to display the columns in the **Sort column(s)** text box.
- You need to specify where you want Minitab to store the sorted data. In this case, put them in the same location they currently occupy.
- Click the **Store sorted column(s) in** text box
- Select the same columns, you selected in the **Sort column(s)** text box and in the **same** order.

Now tell Minitab to use the student's average on the three exams, RMEAN variable, as the sort criterion:

- Click the first **Sort by column** text box
- Select RMEAN to enter it in the first **Sort by column** text box
- Click **Descending** to sort the students' average grade in descending order

Your Sort dialog should look like this



- Click ok
The students' data are ordered according to their mean scores. You now have a summary of your class's performance. Since your worksheet is sorted, you can quickly see which students are not doing well.

C1-T	C2-T	C3	C4	C5	C6	C7	C8	C9	C10	C11	C12
Last Nam	First	Test1	Test2	Test3	Average	RMEAN	RMEDIAN	Total	Test	GRADE	Rank
SHEPPARD,	KATHLEEN	94	97	100	97.0000	97.0000	97	72	1	4	24.0
GOLDBERG,	JONATHAN	98	98	94	96.6667	96.6667	98	99	1	4	23.0
GREEN,	JENNIFER	92	91	99	94.0000	94.0000	92	59	1	4	21.5
MESSINA,	STEVEN	94	93	95	94.0000	94.0000	94	79	1	4	21.5
NORMAN,	BARBARA	99	95	84	92.6667	92.6667	95	48	1	4	20.0
PIERSON,	RICHARD	100	77	100	92.3333	92.3333	100	78	1	4	19.0
BENSON,	MELISSA	99	86	83	89.3333	89.3333	86	98	1	3	18.0
ADAMS,	JAMES	72	93	93	86.0000	86.0000	93	92	1	3	17.0
SCOTT,	MICHAEL	81	75	100	85.3333	85.3333	81	71	1	3	16.0
PATEL,	HIMA	90	100	62	84.0000	84.0000	90	64	1	3	15.0

Document Write up: Include a snapshot of your worksheet and summarize some of the highlights of the sorted data.

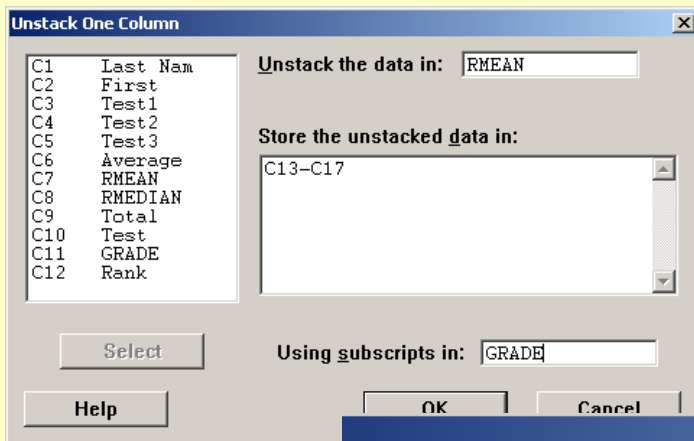
Separating Data with **Unstack**

Ms. Taylor would like a separate listing of all the grades that fall within each of the ranges you specified earlier with the Code Numeric to Numeric feature. Just as you were able to combine several columns into a single column with the Stack option, Minitab lets you take a single column and break it into several new columns, according to criteria you specify.

In this section, you unstack RMEAN into five columns, C11 thru C15.

You put all grades within the range 0 to 59 in the first column, C14, all grades from 60 to 69 in the second column, C15, and so on, using the GRADE data.

- Choose **Manip > Stack/Unstack > Unstack one column**
- Double-click RMEAN to enter it as the variable to unstack in the **Unstack the data in** text box
- Type in **Store the unstacked data in** text box: C13-C17
- Double click GRADE to enter it in the **Using subscripts in** text box

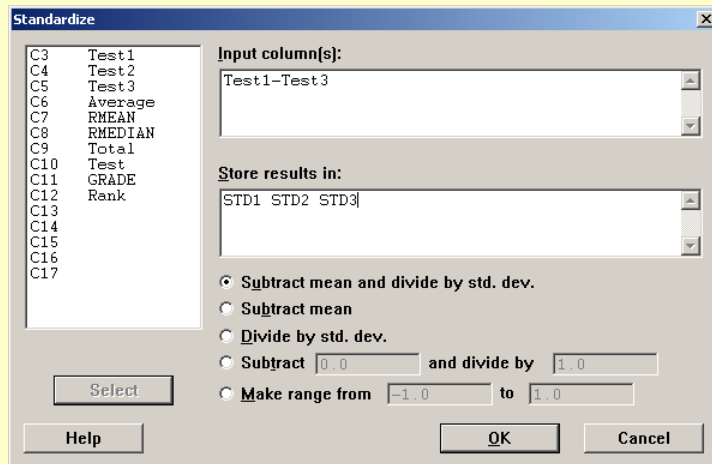


C11	C12	C13	C14	C15	C16	C17	C18
GRADE	Rank						
4	24.0	57.0000	69.3333	78.3333	89.3333	97.0000	
4	23.0	52.6667	69.3333	76.3333	86.0000	96.6667	
4	21.5	50.0000	67.6667	74.0000	85.3333	94.0000	
4	21.5			74.0000	84.0000	94.0000	
4	20.0			71.3333	83.6667	92.6667	
4	19.0			70.3333	80.3333	92.3333	
3	18.0						

Document Write up: Include a snapshot of your worksheet and summarize some of the highlights of the Unstacked data.

Standardizing Data

Select Calc > Standardize



	C10	C11	C12	C13	C14	C15	C16	C17	C18	C19	C20	C21	C22
↓	Test	GRADE	Rank						STD1	STD2	STD3		
1	1	4	24.0	57.0000	69.3333	78.3333	89.3333	97.0000	0.89626	1.18275	1.05442		
2	1	4	23.0	52.6667	69.3333	76.3333	86.0000	96.6667	1.15233	1.25805	0.80713		
3	1	4	21.5	50.0000	67.6667	74.0000	85.3333	94.0000	0.76822	0.73098	1.01321		
4	1	4	21.5			74.0000	84.0000	94.0000	0.89626	0.88157	0.84835		
5	1	4	20.0			71.3333	83.6667	92.6667	1.21635	1.03216	0.39498		
6	1	4	19.0			70.3333	80.3333	92.3333	1.28037	-0.32314	1.05442		
7	1	3	18.0						1.21635	0.35451	0.35376		
8	1	3	17.0						-0.51215	0.88157	0.76592		
9	1	3	16.0						0.06402	-0.47373	1.05442		
10	1	3	15.0						0.64018	1.40864	-0.51176		
11	1	3	14.0						0.70420	-0.02196	0.18890		
12	1	3	13.0						-0.19206	-0.17255	0.43619		
13	1	2	12.0						-0.44813	-0.17255	0.35376		
14	1	2	11.0						-1.02430	-1.00079	0.93078		
15	1	2	9.5						-0.12804	0.95687	-1.00634		
16	1	2	9.5						0.51215	0.88157	-1.37727		
17	1	2	8.0						0.19206	-0.17255	-0.92391		
18	1	2	7.0						-0.57617	-0.24784	-0.51176		
19	1	1	5.5						-1.34439	-1.67844	0.64227		
20	1	1	5.5						-0.06402	-0.92550	-0.59419		
21	1	1	4.0						-1.34439	-1.60315	0.39498		
22	1	0	3.0						-1.98457	-0.17255	-1.29484		

The standardized scores allow you to easily determine how each student performed on each test, relative to the class.

Write a short paragraph identifying trends in students' performance by looking at the data. Explain how you use these data

In your final conclusions, include a short description of what each column represents, how the data are laid out, what piece of information is best suited for your conclusion and what information would you like to be included in this worksheet.