

Guide for analyzing exam results in Excel

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Step 1: Add/remove students and items

The standard Excel contains 10 items and 23 students. Before you can enter the student scores, you must alter the number of students and items to fit your exam. For the usability of this manual, the excel has been shortened to 16 students and 7 items.

Add a student

To add a student, first, you need to add a new column. Select the number of columns you want to add, starting from Student 2. Click the right mouse button and select **Insert** while holding down the Control button. If you have a lot of students, you may need to repeat this step.

	A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P	Q
1		Student 1	Student 2	Student 3	Student 4	Student 5	Student 6	Student 7	Student 8	Student 9	Student 10	Student 11	Student 12	Student 13	Student 14	Student 15	Variance
2	Item 1																#DIV/0!
3	Item 2																#DIV/0!
4	Item 3																#DIV/0!
5	Item 4																#DIV/0!
6	Item 5																#DIV/0!
7	Item 6																#DIV/0!
8																	
9																	
10	Total score	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
11	Grade	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
12																	
13																	
14	Legenda						Max score	P-value	Alpha			#items	6			Rit-value	
15	Orange	Possibility to add extra rows or columns					Item 1	#DIV/0!	-			Sum item variance	#DIV/0!			#DIV/0!	
16	Green	Enter data					Item 2	#DIV/0!	-			Sum variance total score	0			#DIV/0!	
17	Blue	Results					Item 3	#DIV/0!	-							#DIV/0!	
18						Item 4	#DIV/0!	-									#DIV/0!
19		Cesuur (in %)					Item 5	#DIV/0!	-								#DIV/0!
20		Points needed to pass					Item 6	#DIV/0!	-								#DIV/0!
21																	
22						Exam	0	#DIV/0!	#DIV/0!								

Next, you'll want to continue naming the students. You can easily do this by clicking on the cell with the last correctly named student. A little square will appear in the bottom right corner of the selected cell. Click and hold the square. Then drag it toward the cells you want to rename. Excel will automatically continue giving the students successive numbers. Another option you can choose, is to use student numbers as a column header. This might be more work in the beginning, but will pay off when you need to read and enter the final grades.

To finish, you need to enter the formula to calculate the total score of the students. You can copy this formula in the same way you named the students.

The excel should look like this:

	A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P	Q	R
1		Student 1	Student 2	Student 3	Student 4	Student 5	Student 6	Student 7	Student 8	Student 9	Student 10	Student 11	Student 12	Student 13	Student 14	Student 15	Student 16	Variance
2	Item 1																	#DIV/0!
3	Item 2																	#DIV/0!
4	Item 3																	#DIV/0!
5	Item 4																	#DIV/0!
6	Item 5																	#DIV/0!
7	Item 6																	#DIV/0!
8																		
9																		
10	Total score	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
11	Grade	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
12																		
13																		
14	Legenda						Max score	P-value	Alpha			#items	6				Rit-value	
15	Orange	Possibility to add extra rows or columns					Item 1	#DIV/0!	-			Sum item variance	#DIV/0!				#DIV/0!	
16	Green	Enter data					Item 2	#DIV/0!	-			Sum variance total score	0				#DIV/0!	
17	Blue	Results					Item 3	#DIV/0!	-								#DIV/0!	
18						Item 4	#DIV/0!	-										#DIV/0!
19		Cesuur (in %)					Item 5	#DIV/0!	-									#DIV/0!
20		Points needed to pass					Item 6	#DIV/0!	-									#DIV/0!
21																		
22						Exam	0	#DIV/0!	#DIV/0!									

Remove a student

To remove a student, select the column(s) you want to remove. It is important to only remove columns that are blank under the grade. This way, you do not remove cells that are necessary for calculations the results. Then, click the right mouse button and select **Delete**. The selected columns will be removed.

Add an item

To add an item, you first need to add a new row. Select the number of rows you want to add, starting from Item 2. Click the right mouse button and select **Insert** while holding down the Control button. If you have a lot of items, you may need to repeat this step. Rename the cell automatically by selecting the last correctly named item.

A little square will appear in the bottom right corner of the selected cell. Click and hold the square. Then drag it toward the cells you want to rename. Excel will automatically continue giving the items successive numbers. Repeat this step for all the items and formulas.

	A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P	Q	R	
1		Student 1	Student 2	Student 3	Student 4	Student 5	Student 6	Student 7	Student 8	Student 9	Student 10	Student 11	Student 12	Student 13	Student 14	Student 15	Student 16	Variance	
2	Item 1																	#DIV/0!	
3	Item 2																	#DIV/0!	
4	Item 3																	#DIV/0!	
5	Item 4																	#DIV/0!	
6	Item 5																	#DIV/0!	
7	Item 6																	#DIV/0!	
8	Item 6																	#DIV/0!	
9																			
10																			
11	Total score	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
12	Grade	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	
13																			
14																			
15	Legenda							Max score	P-value	Alpha			#items	6			Rit-value		
16	Orange	Possibility to add extra rows or collumns						Item 1	#DIV/0!	-			Sum item variance	#DIV/0!				#DIV/0!	
17	Green	Enter data						Item 2	#DIV/0!	-			Sum variance total score	0				#DIV/0!	
18	Blue	Results						Item 3	#DIV/0!	-								#DIV/0!	
19							Item 4	#DIV/0!	-									#DIV/0!	
20							Item 5	#DIV/0!	-									#DIV/0!	
21	Cesuur (in %)						Item 6	#DIV/0!	-									#DIV/0!	
22	Points needed to pass						Item 6	#DIV/0!	-									#DIV/0!	
23																			
24							Exam	0	#DIV/0!	#DIV/0!									
25																			

Remove an item

To remove an item, select the row you want to remove starting with the last item. Click the right mouse button and select **Delete**. Repeat this step for all the items and formulas.

Step 2: Entering your data

You've changed the Excel to fit your exam. Now it's time to enter your students' test scores, add the maximum obtainable points per question and define the cut off score (NL: cesuur). In the end, you'll have data in all the green cells.

	A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P	Q	R	
1		Student 1	Student 2	Student 3	Student 4	Student 5	Student 6	Student 7	Student 8	Student 9	Student 10	Student 11	Student 12	Student 13	Student 14	Student 15	Student 16	Variance	
2	Item 1																	#DIV/0!	
3	Item 2																	#DIV/0!	
4	Item 3																	#DIV/0!	
5	Item 4																	#DIV/0!	
6	Item 5																	#DIV/0!	
7	Item 6																	#DIV/0!	
8	Item 7																	#DIV/0!	
9																			
10																			
11	Total score	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
12	Grade	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	
13																			
14																			
15	Legenda							Max score	P-value	Alpha			#items	7			Rit-value		
16	Orange	Possibility to add extra rows or collumns						Item 1	#DIV/0!	-			Sum item variance	#DIV/0!				#DIV/0!	
17	Green	Enter data						Item 2	#DIV/0!	-			Sum variance total score	0				#DIV/0!	
18	Blue	Results						Item 3	#DIV/0!	-								#DIV/0!	
19							Item 4	#DIV/0!	-									#DIV/0!	
20							Item 5	#DIV/0!	-									#DIV/0!	
21	Cesuur (in %)						Item 6	#DIV/0!	-									#DIV/0!	
22	Points needed to pass						Item 7	#DIV/0!	-									#DIV/0!	
23																			
24							Exam	0	#DIV/0!	#DIV/0!									
25																			

Enter the test scores

First, fill in the students' item scores in the upper green rectangle.

Enter the max point per question

Next, fill in the maximum obtainable points per question in the lower green column.

Enter a cut off score

Last, enter a cut-off score as a percentage (e.g. 55%). The points needed to pass will automatically be calculated.

You have completed all the necessary steps and can now analyze your exam. Your worksheet should now look like this:

	A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P	Q	R	
1		Student 1	Student 2	Student 3	Student 4	Student 5	Student 6	Student 7	Student 8	Student 9	Student 10	Student 11	Student 12	Student 13	Student 14	Student 15	Student 16	Variance	
2	Item 1	6	2	3	4	5	6	7	8	7	7	7	8	9	5	3	7	3,86	
3	Item 2	7	6	6	1	2	3	4	5	6	7	8	9	8	6	3	4	4,96	
4	Item 3	9	7	5	6	5	4	3	2	1	9	8	7	6	5	4	3	5,31	
5	Item 4	6	2	3	4	5	6	7	8	5	6	3	7	5	8	7	4	3,11	
6	Item 5	7	4	1	2	5	8	9	3	2	6	4	5	6	9	8	7	6,11	
7	Item 6	8	5	6	5	6	3	8	6	1	5	8	6	5	4	7	8	3,59	
8	Item 7	7	4	1	2	5	8	9	6	3	5	6	4	5	6	9	8	5,25	
9																			
10																			
11	Total score	50	30	25	24	33	38	47	38	25	45	44	46	44	43	41	41		
12	Grade	7,7	4,6	3,8	3,7	5,1	5,8	7,2	5,8	3,8	6,9	6,8	7,1	6,8	6,6	6,3	6,3		
13																			
14																			
15	Legenda							Max score	P-value	Alpha			#Items	7			Rit-value		
16	Orange	Possibility to add extra rows or columns						Item 1	10	0,59	-			Sum item variance	32,1953125			0,53	
17	Green	Enter data						Item 2	10	0,53	-			Sum variance total score	67,109375			0,44	
18	Blue	Results						Item 3	10	0,53	-							0,36	
19							Item 4	8	0,67	-								0,52	
20							Item 5	9	0,60	-								0,74	
21	Cesuur (in %)	55%						Item 6	8	0,71	-							0,52	
22	Points needed to pass	35,75						Item 7	10	0,55	-							0,70	
23																			
24							Exam	65	0,59	0,61									
25																			

Step 3: Calculating the grades

In row 12 the student grades can be seen. The formula used for calculating the grades is:

$$\text{Grade} = \frac{4,5}{\text{Max score} - \text{cut-off score}} * \text{Student score} + (10 - \text{Max score} * \left(\frac{4,5}{\text{Max score} - \text{cut-off score}} \right))$$

Step 4: Analyzing the statistics

All the statistics you need are in blue cells.

P-value

The p-value is calculated per question and for the exam as a whole. The data can be found in column I. The p-value reflects the difficulty level of the questions and the exam as a whole.

Alpha

The Cronbach's alpha is a representation of the reliability of the exam.

Rit-value

The Rit-value of an item reflects how well an item can discriminate between students with a low total score and students with a high total score.

More information about interpreting these values can be found [on the TLC website](#) and in this e-learning module on [analyzing exam results](#).

Questions

If you have any questions about this guide or the Excel template, email goedtoetsen-fgw@uva.nl.