



## Using Excel's PivotTable to Analyze Learning-Assessment Data

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University of Hawai'i at Mānoa  
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Mission: Improve student learning  
through program assessment

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## Learning Outcomes

- Set up pivot tables
- Alter pivot table data values
- Sort tables and create filters
- Format pivot tables
- Create pivot charts

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## PivotTable in Action

- Identify duplicates
- Examine student performance by course level
- Identify progress across groups

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## Two Data Scenarios

- Rubric data
- Test score data

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## Data Scenario 1

- Evaluation of student's information literacy skills
- Four dimensions:
  1. Makes use of sources
  2. Relevancy of sources
  3. Credibility of sources
  4. Style integration when referencing sources
- Students from two class levels: 100 and 400

0 – Not Scorable  
1 – Not Prepared  
2 – Partially Prepared  
3 – Prepared  
4 – Well Prepared

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## Review Source Data

ID	Course_Level	Makes_Use	Relevancy	Credibility	Style_Int	TotalScore
1	400	3	3	3	3	12
2	400	2	2	3	2	9
	100	4	4	4	4	16

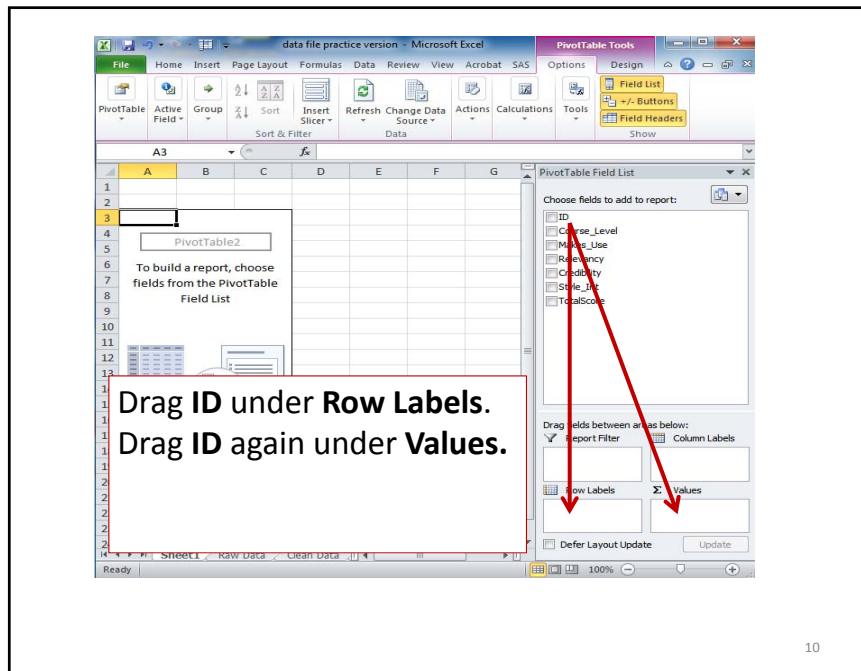
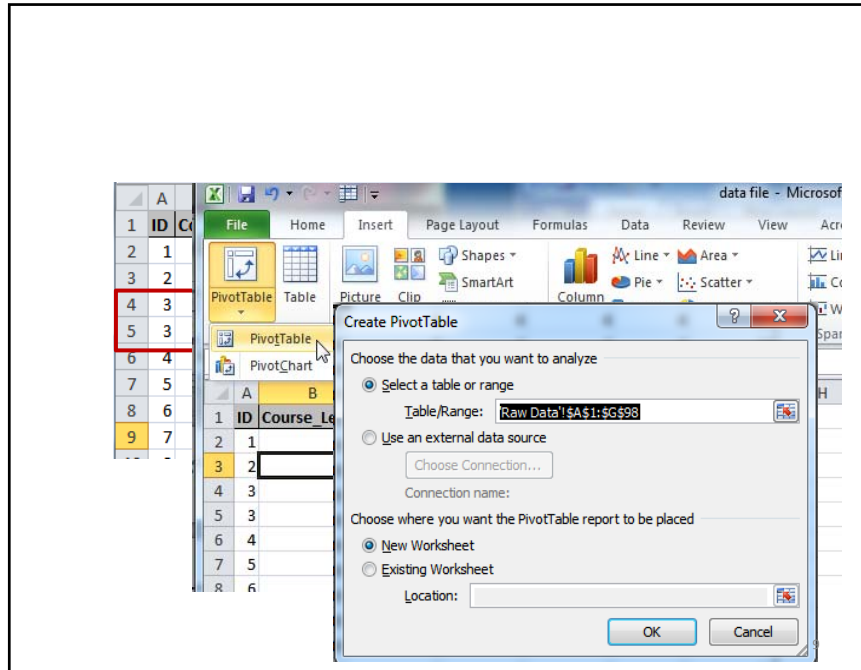
- Give each column a title. Column titles → field names
- Eliminate empty rows and empty columns

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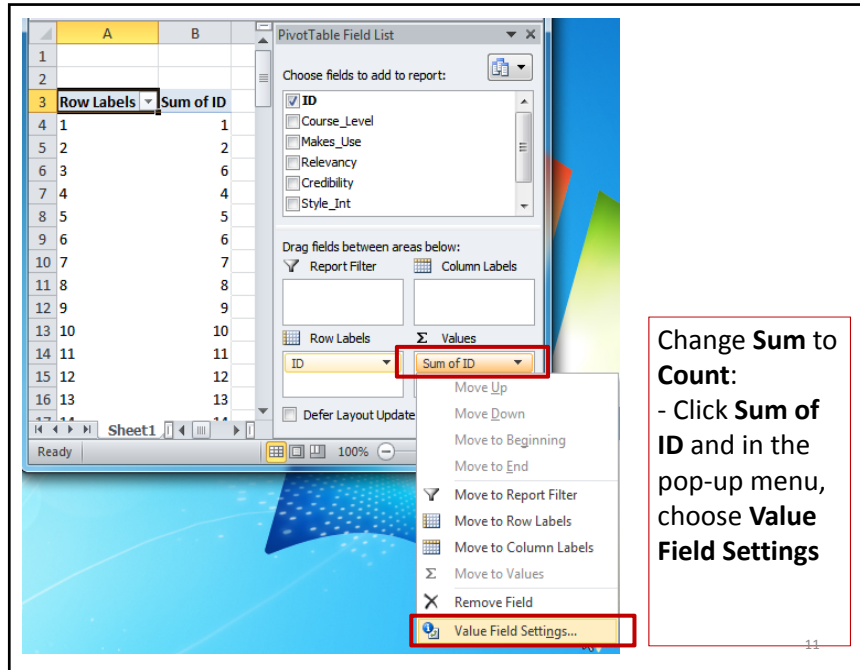
## PivotTable in Action – Identify Duplicates

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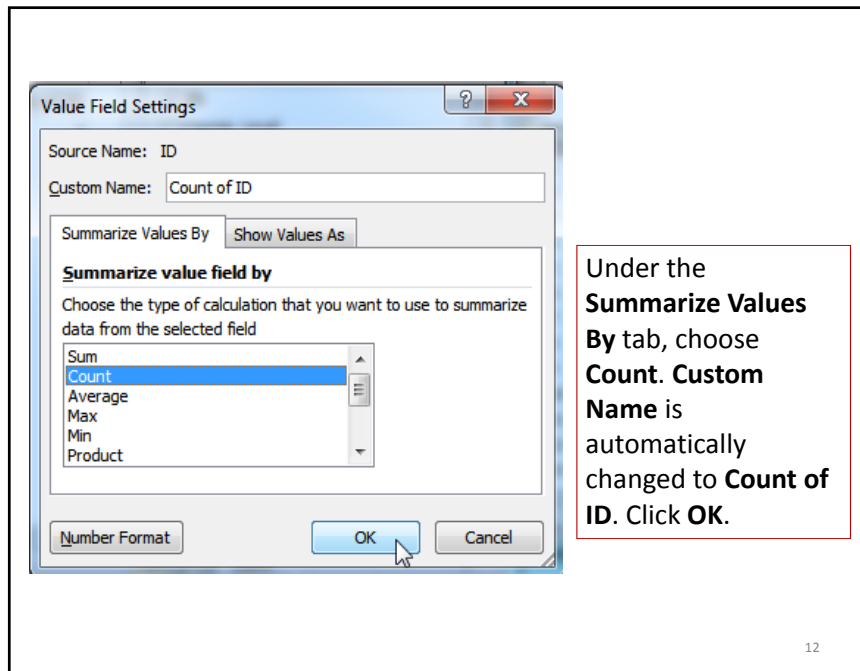


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**Change Sum to Count:**  
- Click **Sum of ID** and in the pop-up menu, choose **Value Field Settings**

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**Under the Summarize Values By tab, choose Count. Custom Name is automatically changed to Count of ID. Click OK.**

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To Sort: Put cursor under **Count of ID**. Open **Options** tab of the **PivotTable Tools** tab. Select the symbol for **Sort Largest to Smallest**

Row Labels	Count of ID
1	1
2	1
3	2
4	1
5	1
6	1
7	1
8	1
9	1
10	1
11	1
12	1
13	1
14	1
15	1

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Row Labels	Count of ID
3	2
18	2
82	2
70	1
54	1
92	1
5	1

In the Raw Data Sheet, find the rows for ID 3, 18, and 82. Make sure that they are true duplicate records. If so, delete one of the duplicates.

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## PivotTable in Action – Examine student performance by course Level

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### Questions of Interest on “Makes Use of Sources”

1. How many students scored 0, 1, 2, 3, 4?
2. Are at least 80% of the students prepared?
3. Are students from 400 level classes more prepared than those from 100 level classes?

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## Steps for Q1: Frequency Count (Demonstration)

1. Open the sheet **Clean Rubric Data**.
2. Put the cursor in the data block.
3. On the **Insert** tab, in the **Tables** group, click **PivotTable**. Choose **PivotTable**.  
The **Create PivotTable** dialog box opens.
4. Make sure the range is correctly specified.  
Choose **New Worksheet** to put the PivotTable.

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5. Drag **Makes\_Use** field under **Row Labels**.
6. Drag **Makes\_Use** field again under **Values**.
7. Click on **Sum of Makes\_Use** and choose **Value Field Settings** in the pop-up menu.
8. In the pop-up window, under **Summarize Values By** tab, choose **Count**. Notice that the **Custom Name** changes to **Count of Makes\_Use**.

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Choose a desired design

Give a title to the table

Change Column Titles

Rating Scales	Number of Students
0	1
1	10
2	24
3	30
4	29
<b>Grand Total</b>	<b>94</b>

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How many students scored 0, 1, 2, 3, 4?

What are the answers?

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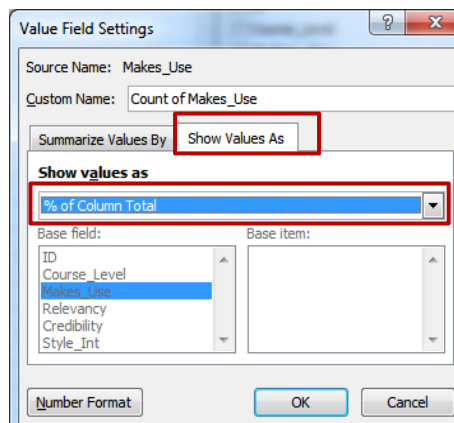
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## Steps for Q2: Percent Calculation & Grouping (Demonstration)

1. In the PivotTable Field List, drag **Makes\_Use** under the **Values** again.
2. Follow the earlier steps and change the value from **Sum** to **Count** in **Value Field Settings**.
3. With the **Value Field Settings** pop-up window open, click on the **Show Values As** tab.
4. In the dropdown menu, choose **% of Column Total**.

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- Change the column title to **% of Students**.
- Under **Rating Scales**, select the rows for scale **0, 1 and 2**. Right Click, choose **Group**.

Rating Scales	Number of Students	% of Students
0	1	1%
1	10	11%
2	24	26%
3	30	32%
4	29	31%
<b>Grand Total</b>	<b>94</b>	<b>100%</b>

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- Select Scale **3 and 4**; right click; and choose **Group** in the pop-up menu.

Rating Scales	Number of Students	% of Students
<b>Group1</b>		
0	1	1%
1	10	11%
2	24	26%
3	30	32%
4	29	31%
<b>Grand Total</b>	<b>94</b>	<b>100%</b>

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- Click on the **-/+ box** besides **Group1**. The - sign changes to a + sign, and all the items under **Group1** are collapsed.

Performance in Make Use of Sources Criterion			
Rating Scales	Number of Students	% of Students	
+ Group1	35	37%	
- Group2			
3	30	32%	
4	29	31%	
<b>Grand Total</b>	<b>94</b>	<b>100%</b>	

- Click the **-/+ box** besides **Group2**.
- Rename **Group1** to **Not Prepared**, and **Group2** to **Prepared**.

Performance in Make Use of Sources Criterion			
Rating Scales	Number of Students	% of Students	
+ Not Prepared	35	37%	
+ Prepared	59	63%	
<b>Grand Total</b>	<b>94</b>	<b>100%</b>	

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Are at least 80% of the students prepared?

What is the answer?

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## Practice 1

- Create a pivot table to answer the question:  
 What is the number and percent of students prepared for selecting relevant sources (**Relevancy**)?

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## Steps for Q3: Crosstab (Demonstration)

1. Drag **Course\_Level** under **Column Labels**.
2. Place **Course\_Level** above **Values** in **Column Labels**.
3. To present data vertically, move **Values** from **Column Labels** to **Row Labels**.

Performance in Make Use of Sources Criterion			
Rating Scales	Column Labels		
	100	400	Grand Total
<b>Not Prepared</b>			
Number of Students	20	15	35
% of Students	47%	29%	37%
<b>Prepared</b>			
Number of Students	23	36	59
% of Students	53%	71%	63%
<b>Total Number of Students</b>	<b>43</b>	<b>51</b>	<b>94</b>
<b>Total % of Students</b>	<b>100%</b>	<b>100%</b>	<b>100%</b>

The PivotTable Field List on the right shows the following configuration:

- Choose fields to add to report:** ID, Course\_Level, Makes\_Use, Relevancy, Credibility, Style\_Int.
- Drag fields between areas below:**
  - Report Filter:** (empty)
  - Column Labels:** Course\_Level
  - Row Labels:** Values
  - Values:** Makes\_Use2, Number of St..., % of Students

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Are students from 400 level classes  
more prepared than those from 100  
level classes?

What is the answer?


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What are the results of the students  
who scored 1, 2, 3, and 4?

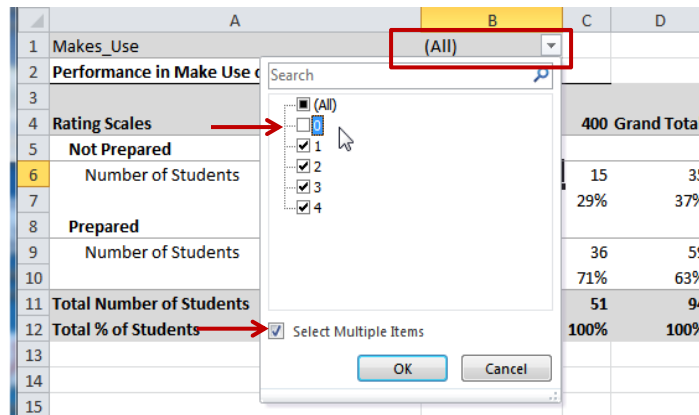


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## Steps to Create a Filter (Demonstration)

- In **PivotTable Field List**, drag **Makes\_Use** under  **Report Filter**
- Filter appears on top of the table. In the drop down menu, check **Select Multiple Items**, then uncheck **0**.

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Makes_Use			
Performance in Make Use of			
Rating Scales			
Not Prepared			
Number of Students	15	35	
	29%	37%	
Prepared			
Number of Students	36	59	
	71%	63%	
<b>Total Number of Students</b>	<b>51</b>	<b>94</b>	
<b>Total % of Students</b>	<b>100%</b>	<b>100%</b>	

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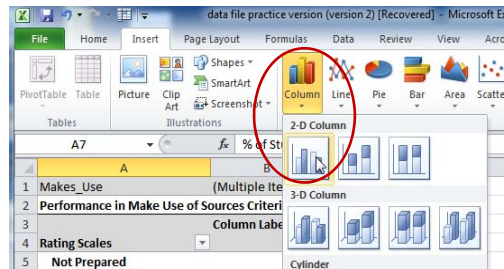
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## Present Data Graphically

- Put the cursor inside of the PivotTable, on **Insert** tab, in the **Charts** group, click **Column**, then click **Clustered Column** under **2-D Column** (the first choice).



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## Consider Cleaning Up the Chart

1. Remove **Number of Students** Field: Right click **Number of Students**. Choose **Remove Field**. Notice the changes made in the PivotChart will affect the PivotTable.
2. Add data labels.
3. Delete gridlines.
4. Reformat Axis to expand the range from 0 to 100%.
5. Place the legend at the bottom of the chart.

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## Exercise 2

- Create a pivot chart to show the percent of prepared and not prepared students in terms of credibility of sources selected for their essays (**Credibility**).

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## PivotTable in Action – Identify Progress Across Groups

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## Data Scenario 2

- A natural science program is investigating the effect of peer mentoring.
- Half of the classes received peer mentors and half did not:
  - Mentor Supported vs.
  - No Mentor Regular
- Three tests were given during the semester:
  - Beginning (Test1)
  - Mid (Test2)
  - End (Test3)

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## Task

- Examine the average scores on the three tests and observe whether there is a difference in the progress between the two groups.

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## Steps for Examine Test Progress (Demonstration)

1. Select all the data in the dataset on the Test Data sheet.
2. Insert a PivotTable in a new sheet.
3. Drag Class Type under Column Labels
4. (Click on Column Label filter and uncheck Blank.)
5. Drag Test1, Test2, and Test3 under Values.
6. Change Values Field Settings for Test1, Test2, and Test3 to Summarize Values By Average.
7. Format and clean up the table.

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	Column Labels <input type="button" value="v"/>		
Average Test Score	Mentor Supported	No Mentor Regular	Grand Total
Average of Test1	2.10	1.86	1.99
Average of Test2	3.18	2.21	2.73
Average of Test3	3.12	2.53	2.85

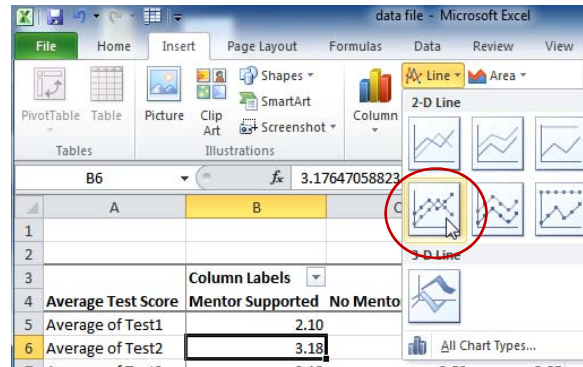
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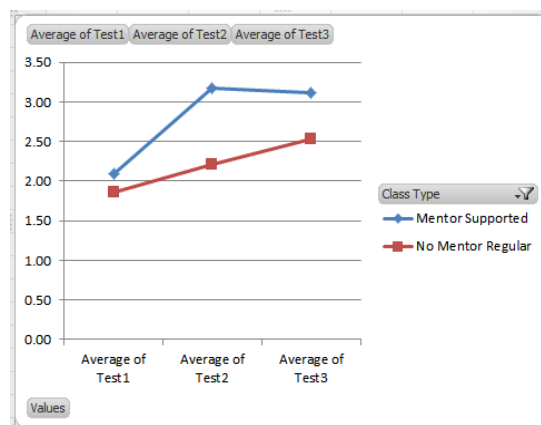
## Present Data Graphically

- Put the cursor inside of the PivotTable, on **Insert** tab, in the **Charts** group, click **Line**, then click **Line with Markers** under **2-D Line**



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## Resulting PivotChart

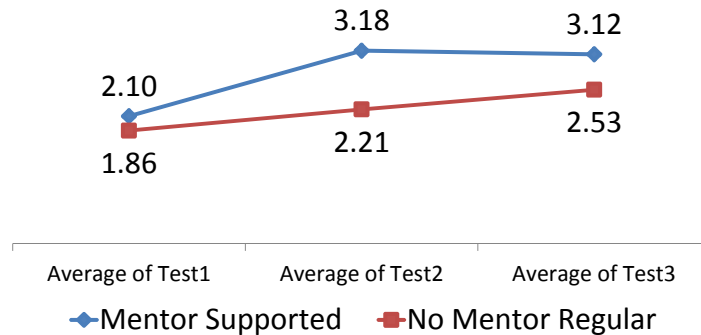


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## Clean Up the Chart



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## Considerations When Cleaning Up the Chart

1. Reformat Axis to represent the full possible score range (e.g., 0 to 5).
2. Add data labels.
3. Format data labels so that they don't overlap with the lines.
4. Delete gridlines.
5. Place the legend at the bottom of the chart.
6. Increase fonts and line thickness in ppt.

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## Copy and Paste PivotTable

- Copy the whole PivotTable → paste to another PivotTable
- Copy part of the PivotTable → paste to another regular table.

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## Review of PivotTable Techniques

- Set up pivot tables
- Alter pivot table data values
  - #, %, average
- Sort tables and create filters
- Format pivot tables
  - group, table design, present data vertically
- Create pivot charts

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## Questions

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