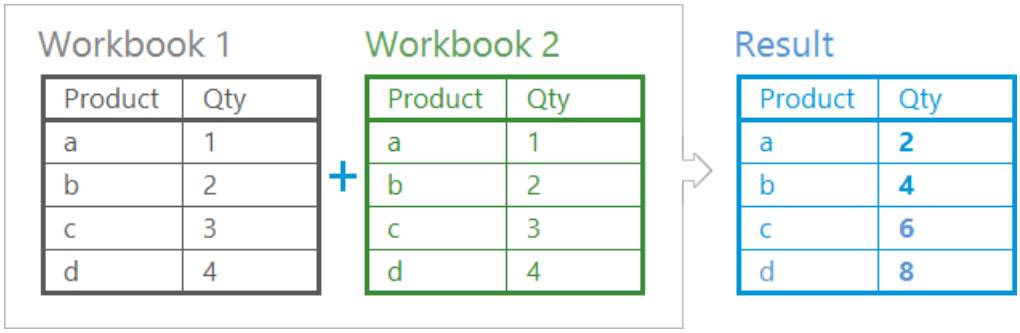
1. Consolidating Data in Multiple Worksheets

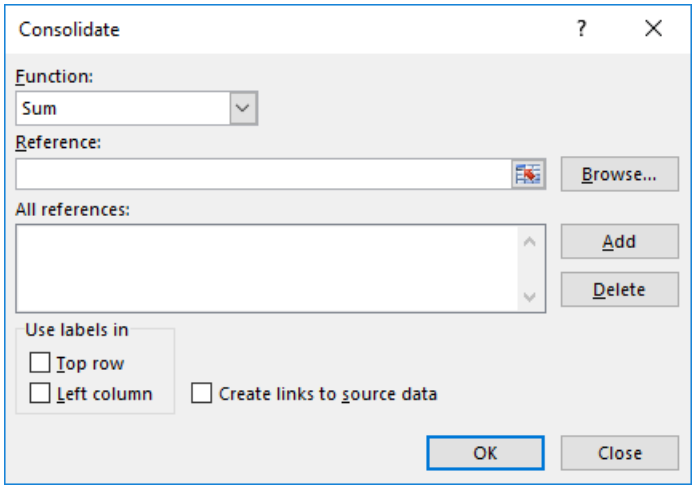
1.1 Overview

To summarize and report results from multiple worksheets, you can consolidate data from each worksheet into a master worksheet. The worksheets can be in the same workbook or other workbooks. When you consolidate data, you are assembling data so you can more easily update and aggregate it on a regular or ad hoc basis.

For example, if you have a worksheet of expense figures for each of your regional offices, you might use a consolidation to roll up these figures into a corporate expense worksheet. This master worksheet might contain sales totals and averages, current inventory levels, and highest selling products for the entire enterprise.



To consolidate data, you use the **Data** tab and then **Consolidate** to display the **Consolidate** dialog box.



You can use this dialog box in several ways to consolidate your data:

Position Use this approach when the data in all worksheets is arranged in identical order and location.

Category Use this approach when each worksheet organizes the data differently, but has the same row and column labels, which you can use to match the data.

3-D Formulas Use this approach when the worksheets do not have a consistent pattern you can rely on. You can create formulas that refer to cells in each range of data that you're combining. Formulas that refer to cells on multiple worksheets are called 3-D formulas

1.2 Consolidate by Position or Category

Consolidate by position when the data in all source areas is arranged in identical order and location; for example, if you have data from a series of worksheets that were created from the same template, you can consolidate the data by position.

Consolidate by category when you want to summarize a set of worksheets that have the same row and column labels but organize the data differently. This method combines data that has matching labels from each worksheet.

You can set up the consolidation to update automatically when the source data changes, but you won't be able to change which cells and ranges are included in the consolidation. Or you can update the consolidation manually, allowing you to change the included cells and ranges.

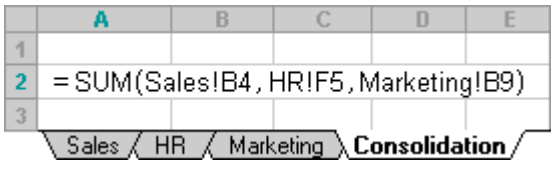
1. Set up the data to be consolidated.
2. Click the upper-left cell of the area where you want the consolidated data to appear.
3. Select **Data** tab, and then select **Consolidate** to popup the **Consolidate** dialog box.
4. In the **Function** box, click the summary function you want Excel to use to consolidate the data.
5. Click the **Reference** box, click the sheet tab of the first range to consolidate, type the name you gave the range, and then click **[Add]**. Repeat this step for each range.
6. If you want to update the consolidation table automatically whenever data in any of the source ranges changes, and you're sure you won't want to include different or additional ranges in the consolidation later on, select the **Create links to source data** check box.
7. If you're consolidating by position, leave the boxes under **Use labels in** blank. Excel does not copy the row or column labels in the source ranges to the consolidation. If you want labels for the consolidated data, copy them from one of the source ranges or enter them manually.
8. If you're consolidating by category, select the check boxes under **Use labels in** that indicate where the labels are located in the source ranges: either the **top row**, the **left column**, or both. Any labels that don't match up with labels in the other source areas result in separate rows or columns in the consolidation.

1.3 Consolidate by Using 3-D Formulas

When you use 3-D references in formulas, there are no restrictions on the layout of the separate ranges of data. You can change the consolidation any way you need to. The consolidation updates automatically when the data in the source ranges changes.

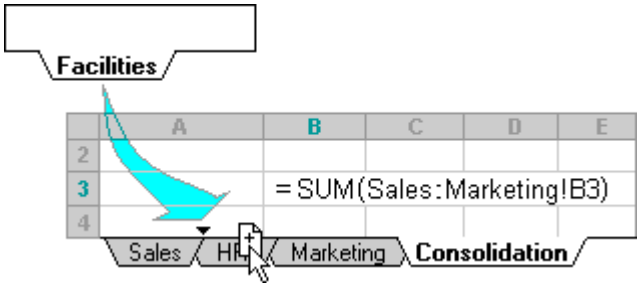
1.3.1 Use formulas to combine data

In the following example, the formula in cell A2 adds three numbers that are located in different positions on three different worksheets.



1.3.2 Add data to a consolidation with 3-D references

When all of your source worksheets have the same layout, you can use a range of sheet names in 3-D formulas. To add another worksheet to the consolidation, just move the sheet into the range your formula refers to.



1.3.3 Step to create 3-D Formulas Consolidation

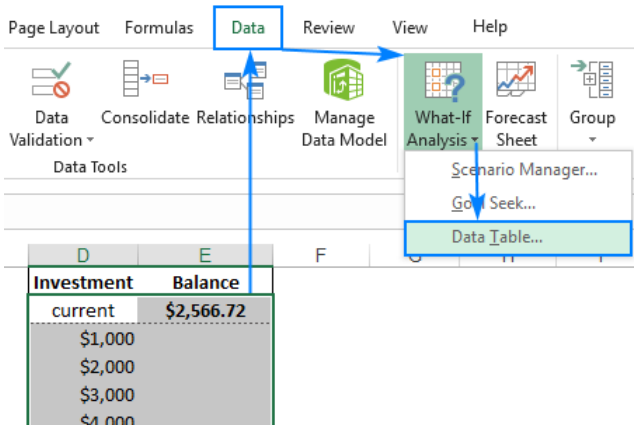
1. On the consolidation worksheet, copy or enter the labels you want for the consolidated data.
2. Click a cell that you want to contain consolidated data.
3. Type a formula that includes references to the source cells on each worksheet that contains data you want to consolidate. For example, to combine the data in cell B3 from worksheets Sheet 2 through Sheet 7 inclusive, you could type =SUM(Sheet2:Sheet7!B3). If the data to consolidate is in different cells on different worksheets, enter a formula such as this: =SUM(Sheet3!B4, Sheet4!A7, Sheet5!C5). To enter a reference such as Sheet3!B4 in a formula without typing, type the formula up to the point where you need the reference, click the worksheet tab, and then click the cell.

2. Data Table

2.1 Overview

Data Tables are a tool used frequently in Excel models to track how small changes in inputs affect the results of formulas in your model that are dependent on those inputs. An analysis of this sort is often termed a sensitivity analysis. Excel has two varieties of Data Table:

- The One-Variable Data Table
- The Two-Variable Data Table



2.2 The One-Variable Data Table

The One-Variable Data Table allows you to identify a single decision variable in your model and see how changing the values for that variable affect the values calculated by one or more formulas in your model.

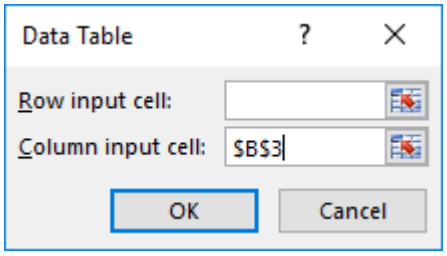
	Formula
Input Value 1	***Result***

Design your one-variable Data Table so that input values are listed either down a column (column-oriented; most common) or across a row (row-oriented). Formulas used in a one-variable Data Table must refer to an input cell for your spreadsheet model.

1. Type the list of values you want to substitute in the input cell either down one column or across one row.
2. If the input values are listed down a column, type the formula in the row above the first value and one cell to the right of the column of values. Type any additional formulas to the right of the first formula. If the input values are listed across a row, type the formula in the column to the left of the first value and one cell below the row of values. Type any additional formulas below the first formula.

	A	B	C	D	E
1					
2	Mortgage:	3,200,000			=B5
3	Interest Rate:	2.75%		2.50%	
4	Number of Year:	30		2.75%	
5	Monthly Payment:	13,064		3.00%	
6				3.25%	

3. Select the range of cells that contains the formulas and values you want to substitute.
4. From the menus choose **Data** tab, **What-If Analysis** group, **Data Table**. Excel displays the **Table** dialog that asks you to identify the cell reference for the input cell.
   - If the Data Table is column-oriented, type the cell reference for the input cell in the "**Column input cell**" box.
   - If the Data Table is row-oriented, type the cell reference for the input cell in the "**Row input cell" box**.



5. Click **[OK]** to have Excel execute the Data Table and fill the Data Table matrix with values. Understanding how to structure your Data Table and respond to the "Table" dialog prompt is the key to a successful Data Table.

	A	B	C	D	E	F
1						
2	Mortgage:	3,200,000			13,064	
3	Interest Rate:	2.75%		2.50%	12,644	
4	Number of Year:	30		2.75%	13,064	
5	Monthly Payment:	13,064		3.00%	13,491	
6				3.25%	13,927	
7				3.50%	14,369	
8				3.75%	14,820	
9				4.00%	15,277	
10				4.25%	15,742	
11				4.50%	16,214	
12				4.75%	16,693	
13				5.00%	17,178	
14				5.25%	17,671	
15				5.50%	18,169	
16				5.75%	18,674	
17				6.00%	19,186	
18						

2.3 The Two-Variable Data Table

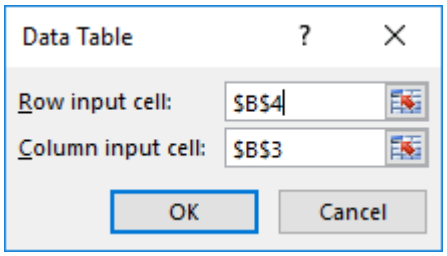
With the Two-Variable Data Table you can specify two decision variables and a variety of inputs and only a single formula.

Formula	**Input Value 2**
Input Value 1	***Result***

1. Type the list of values you want to substitute in the input cell either down one column or across one row, we could set up a Two-Variable Data Table to look like this:
2. In the upper left-hand cell of the Data Table is a copy of the formula from elsewhere in the model or a reference to the cell that holds the formula in the model.

	A	B	C	D	E
1					
2	Mortgage:	3,200,000		=B5	10
3	Interest Rate:	2.75%		2.50%	
4	Number of Year:	30		2.75%	
5	Monthly Payment:	13,064		3.00%	
6				3.25%	

3. Execute the Two-Variable Data Table in the same way you would execute the One-Variable Table. That is, select the entire matrix to the right and below the values you've specified. From the menus choose **Data** tab, **What-If Analysis** group, **Data Table**. Excel displays the **Table** dialog that asks you to identify the cell reference for the input cell.
4. This time, because you've specified two inputs, you must enter values for both Row input cell and Column input cell in the "Data Table" dialog.



5. Click the **[OK]** button to execute the Data Table and see the results:

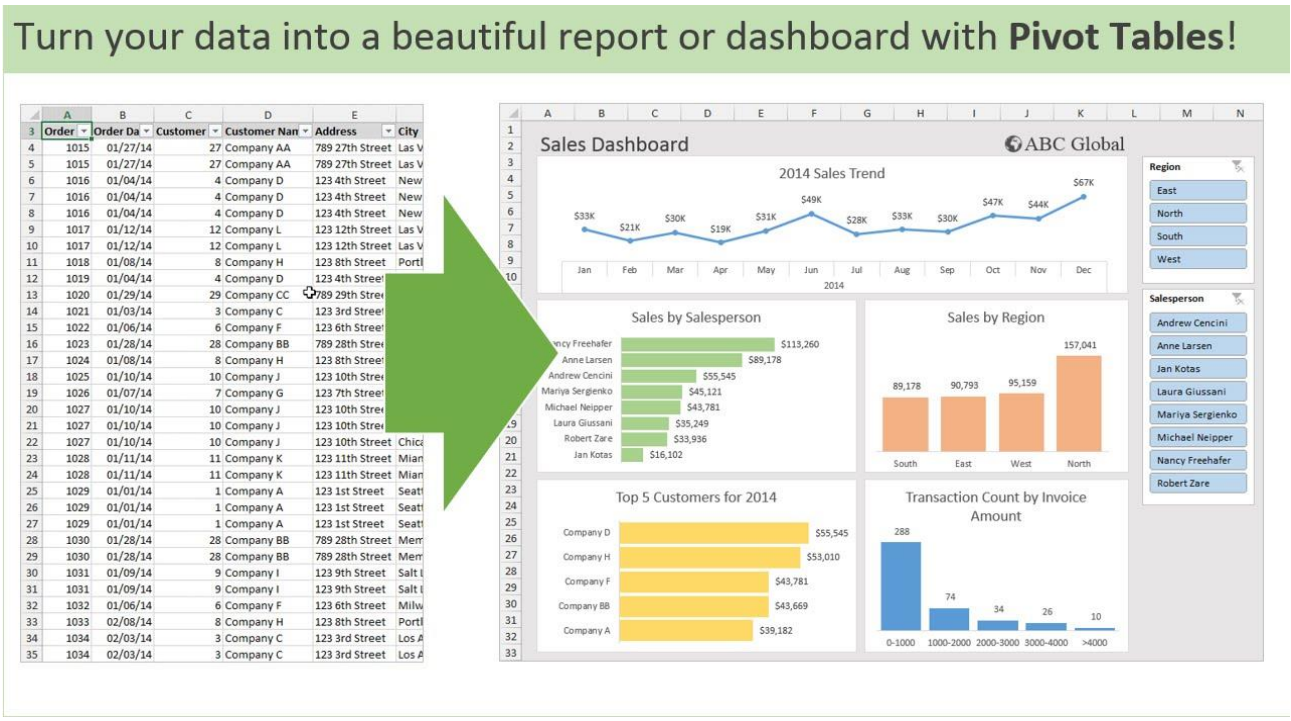
	A	B	C	D	E	F	G	H	I
1									
2	Mortgage:	3,200,000		13,064	10	15	20	25	30
3	Interest Rate:	2.75%		2.50%	30,166	21,337	16,957	14,356	12,644
4	Number of Year:	30		2.75%	30,532	21,716	17,349	14,762	13,064
5	Monthly Payment:	13,064		3.00%	30,899	22,099	17,747	15,175	13,491
6				3.25%	31,270	22,485	18,150	15,594	13,927
7				3.50%	31,643	22,876	18,559	16,020	14,369
8				3.75%	32,020	23,271	18,972	16,452	14,820
9				4.00%	32,398	23,670	19,391	16,891	15,277
10				4.25%	32,780	24,073	19,816	17,336	15,742
11				4.50%	33,164	24,480	20,245	17,787	16,214
12				4.75%	33,551	24,891	20,679	18,244	16,693
13				5.00%	33,941	25,305	21,119	18,707	17,178
14				5.25%	34,333	25,724	21,563	19,176	17,671
15				5.50%	34,728	26,147	22,012	19,651	18,169
16				5.75%	35,126	26,573	22,467	20,131	18,674
17				6.00%	35,527	27,003	22,926	20,618	19,186
18									
19									

3. Pivot Table

3.1 Introduction

Imagine being faced with a pile of data that you need to organize and summarize in a hurry. And what's more, you have to present the information in a way that highlights specific aspects of the data.

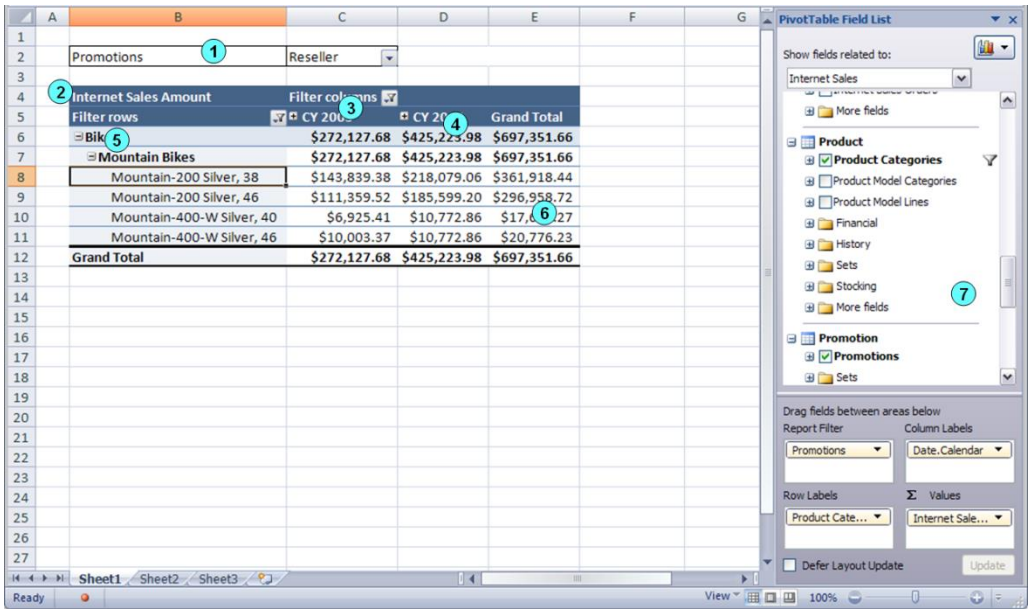
If this sounds familiar, the PivotTable report feature in Excel could be what you're looking for. PivotTable reports are interactive tables that make it possible for you to move information around, so that you can see how it fits together. PivotTable reports help you to organize and compare data so that you can see patterns, trends, and relationships. And it takes only seconds to pivot the rows and columns of data from one view to another, like turning a kaleidoscope to see the different patterns.



3.2 When to use a PivotTable Report

Use a PivotTable report when you want to compare related totals, especially when you have a long list of figures to summarize and you want to compare several facts about each figure. Use PivotTable reports when you want Microsoft Excel to do the sorting, subtotaling, and totaling for you. In the example below, you can easily see how the third-quarter golf sales stack up against sales for another sport or quarter, or grand total sales. Because a PivotTable report is interactive, you or other users can change the view of the data to see more details or calculate different summaries.

3.3 Anatomy of a PivotTable Report



① Page field A field from the source data that you assign to a page (or filter) orientation in a PivotTable report. *For example, grade is a page field. You can use the Year field to display summarized data for only 2003, only 2004, and so on*

② Data field A field from the source data that contains values to be summarized. *For example, Count of studho is a data field.*

For most types of source data you can choose how to summarize data (for example, by sum, average, or count). A data field usually summarizes numbers, but it can also summarize text. *For example, you can count the number of times a specific text entry (such as Yes or No) appears in a field.*

③ Column field A field from the source data that you assign to a column orientation in a PivotTable report. *For example, ethnic is a column field.*

④ Item A subcategory of a row, column, or page field. *For example, the ethnic field contains the following items: AA and L. The cela04 field contains these items: FB, BB, BA, PR, AD*

⑤ Row field A field from the source data that you assign to a row orientation in a PivotTable report. *For example, cela04 is a row field.*

⑥ Data area The cells in a PivotTable report that contain counted data. *For example, the value in cell C5 counts the number of Latino students who performed at the Far Below Basic level on the 2004 CST ELA (42)*

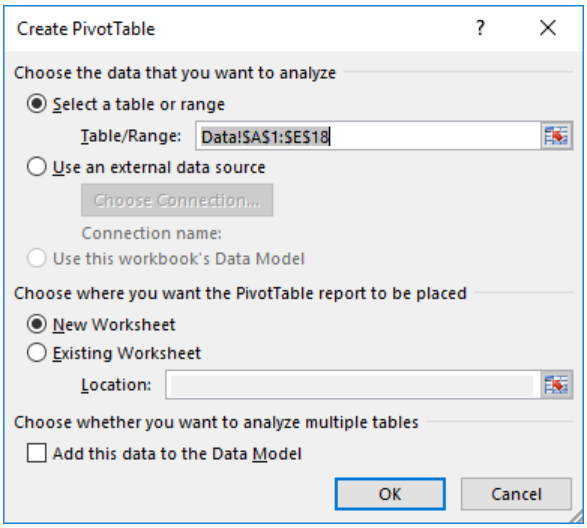
⑦ Field List List of all possible fields from the original data.

3.4 Create a PivotTable report

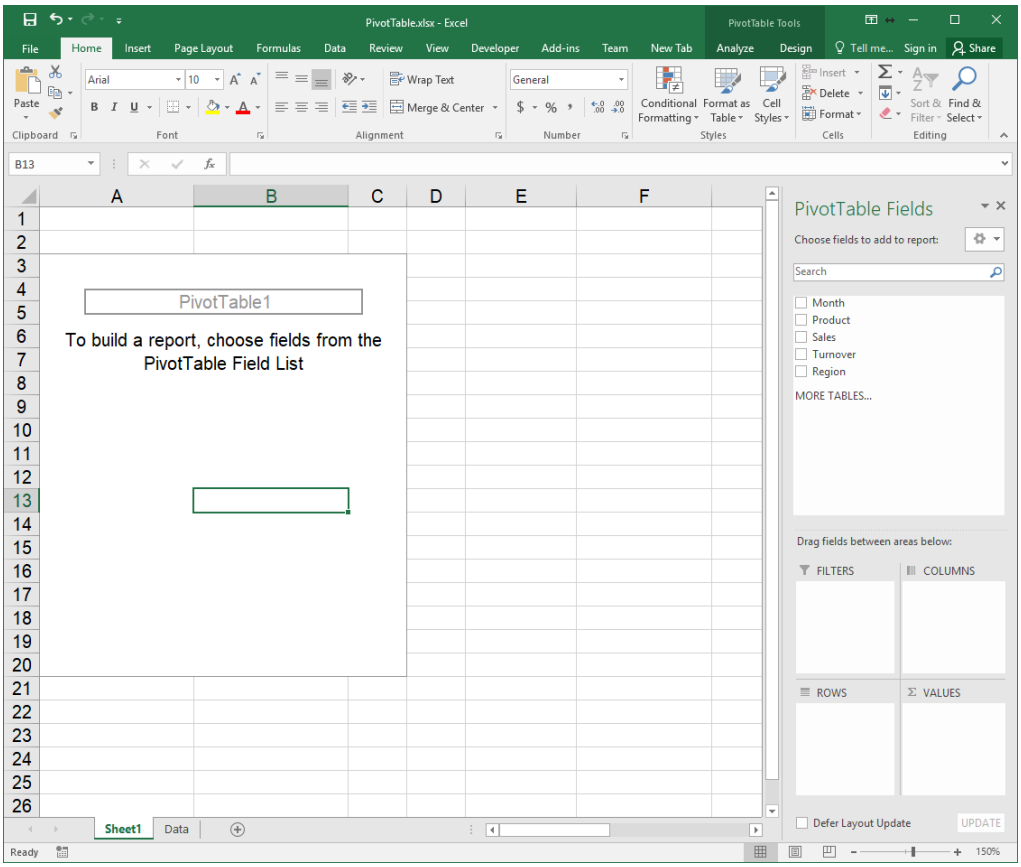
To create a PivotTable report, use the PivotTable and PivotChart Wizard as a guide to locate and specify the source data you want to analyze and to create the report framework.

You can then use the PivotTable toolbar to arrange the data within that framework.

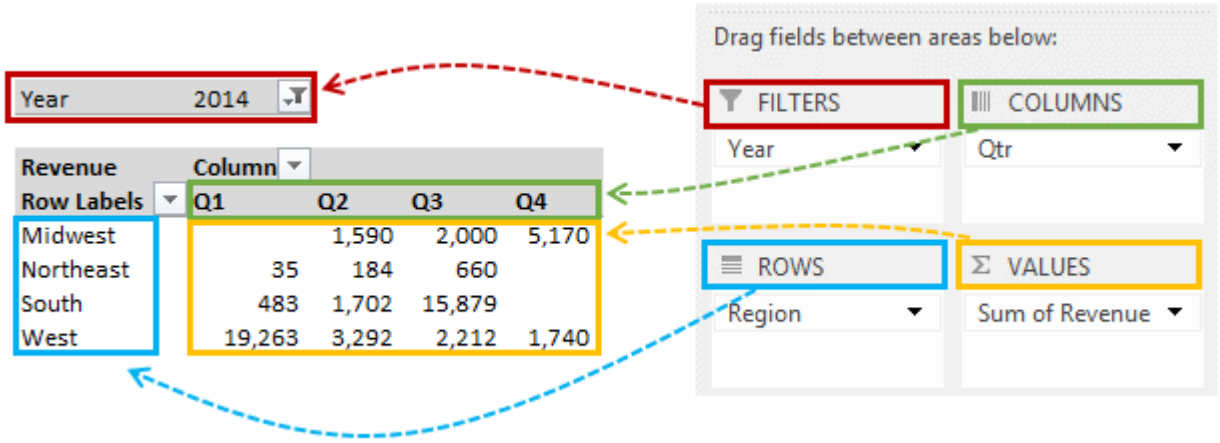
1. Open your original spreadsheet and remove any blank rows or columns. Make sure each column has a heading, as it will be carried over to the Field List
2. Highlight your data range, select **Insert** tab, **PivotTable** group, **PivotTable.**
3. Select the radio button for **New Worksheet** in the **Create PivotTable** dialog, then press **[OK]**.



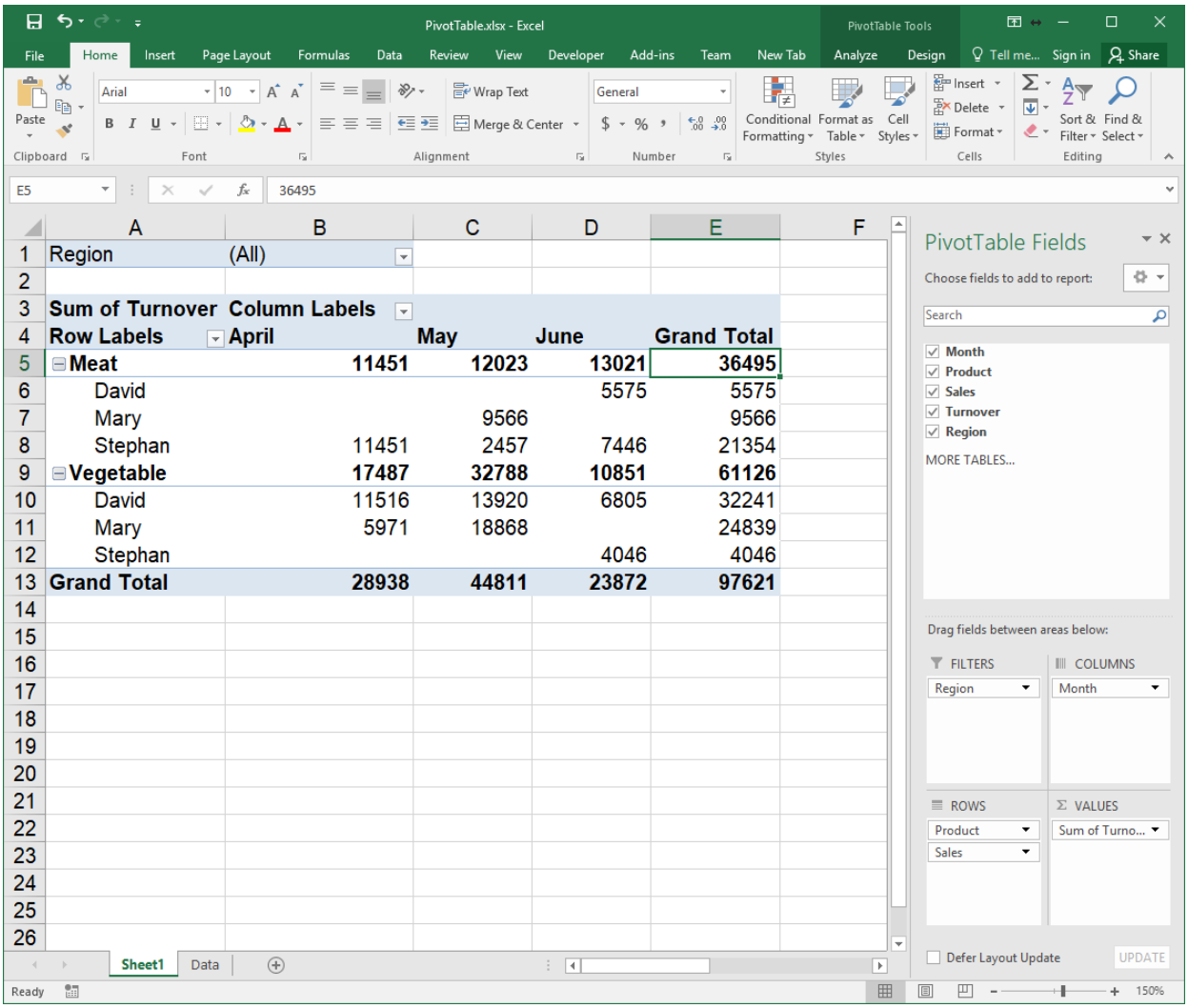
4. A new worksheet opens with a blank pivot table. You'll see that the fields from our source spreadsheet were carried over to the **PivotTable Field List**.



5. Drag an item from the **PivotTable Field List** down to the **Row Labels** quadrant.



Whenever possible, lay out the **PivotTable** report directly on the sheet so that you can view the data while you arrange the fields.



3.5 Customize a PivotTable Report

You've now created a PivotTable report, but that's only the beginning. A PivotTable report is more than just a static summary; you can use it to interactively explore the data's significance. Zero in on the details or pull back for an overview. You decide the type of customizations you want. To customize your PivotTable report, do one or more of the following:

3.5.1 Add or Remove Data

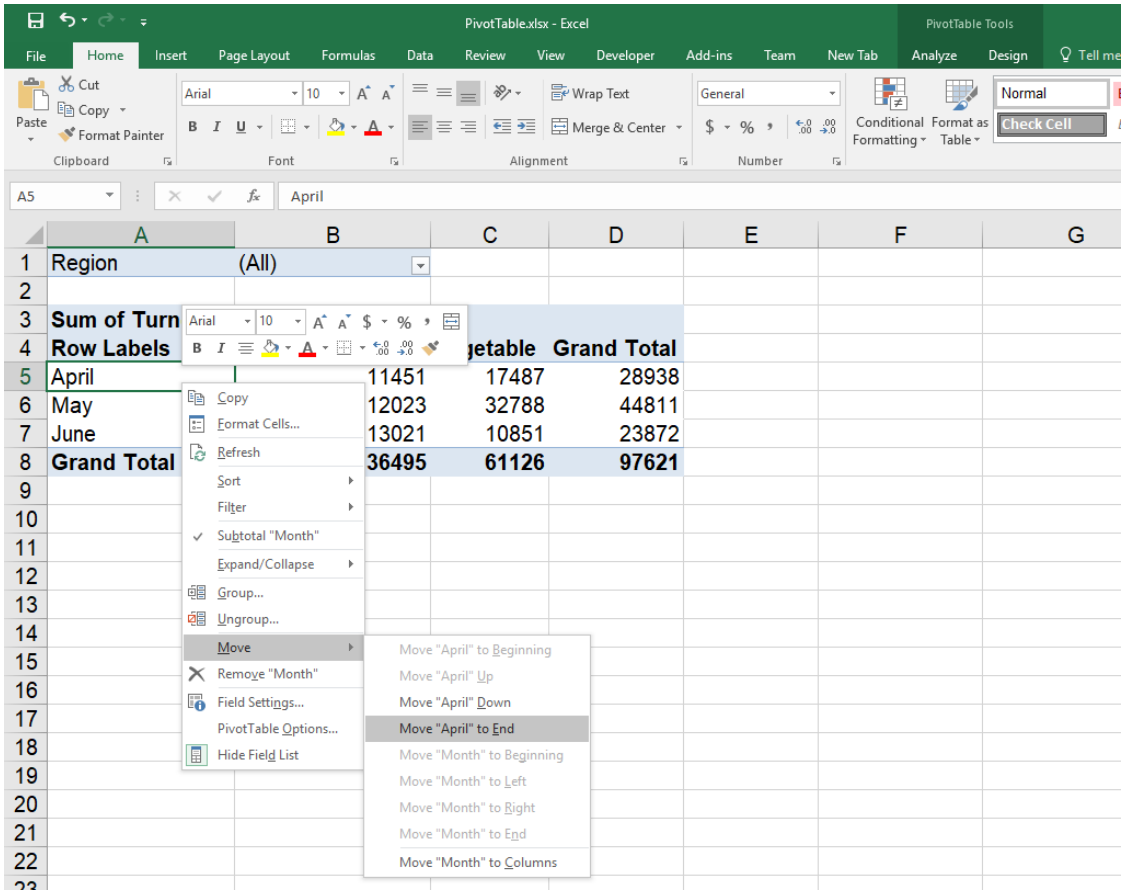
You can easily add or remove a field—including a row, column, or page field. To add a field, drag a field from the PivotTable Field List window to the appropriate area on the PivotTable report. To remove a field, drag a field outside the PivotTable report.

3.5.2 Quickly Rearrange the Layout

You can quickly "pivot" the report by moving a field or reordering the items within a field. To move a field, drag the field to the appropriate area on the PivotTable report. To reorder items within a field, drag an item to a new location in the field.

3.5.3 Rearrange the Order of Items in the Field

Right click on the item that you want to re-order, choose order from the drop menu and decide where you want to move the item relative to the other items.



3.5.4 Use Page Fields to View a Subset of the Data

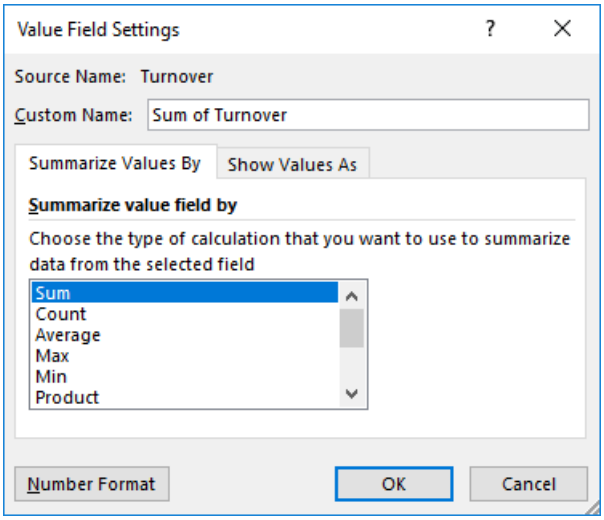
Each page contains a subset of the data that's summarized in the report.

To view a different page, click the arrow next to the page field item (grade on our report), and then click an item in the list.

3.5.5 Use Custom Calculations to Fine Tune Result

You may get a different perspective on the data by seeing the data as a percent of the items that you are displaying.

1. Right-click on the data field, click **Field Settings** from pop-up menu
2. In the **Pivot Table Field** window, click on **[Options]** to reveal additional choices
3. In the **Field Setting** box, select the calculation you want. Try percent of total, or percent of column as appropriate. You can set **Show data as** to **Normal** turns off custom calculation.

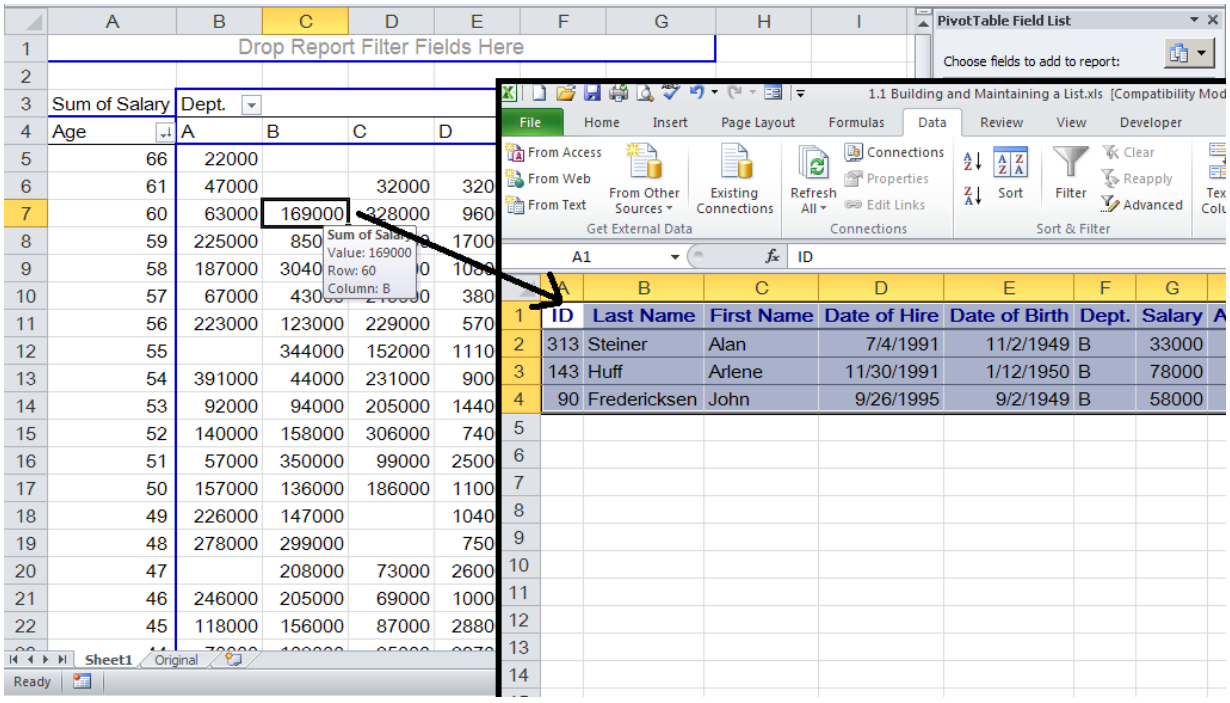


3.5.6 Show the Details you Want

In a PivotTable report, you can drill down on the details or hide information for a big picture view.

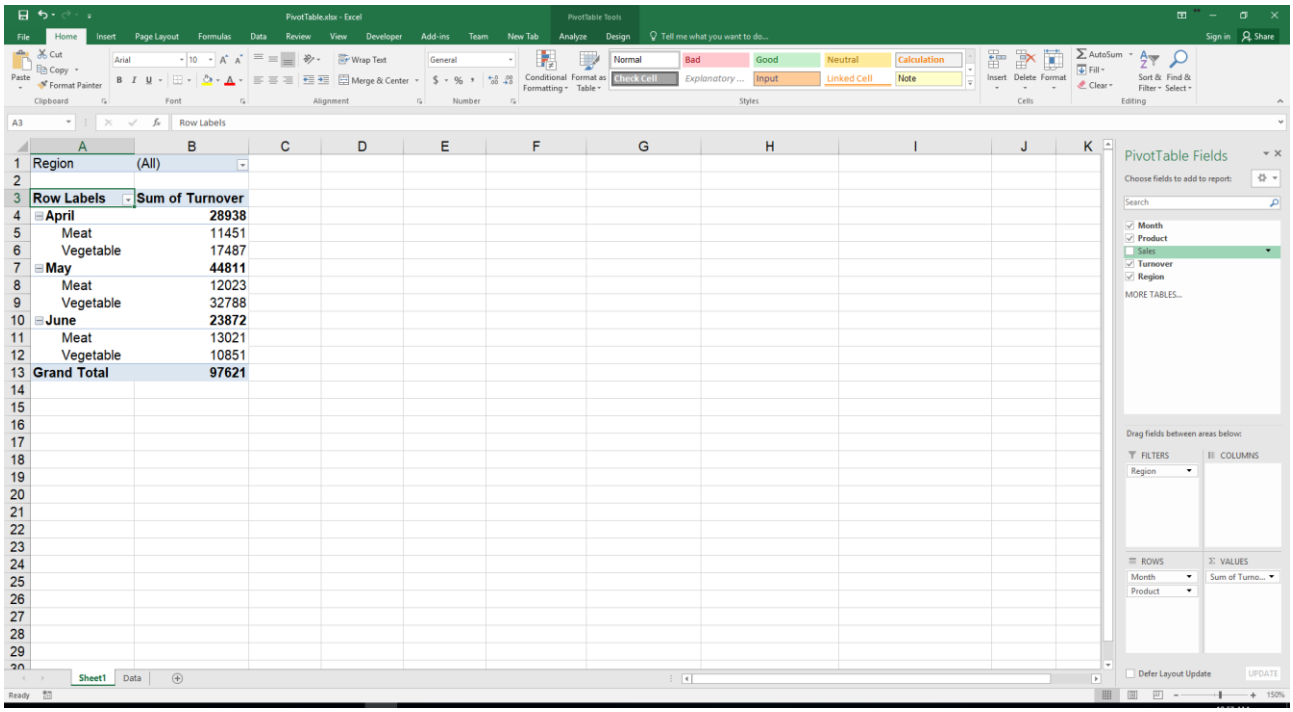
3.5.6.1 Display the underlying source data for a specific data cell

Just double-click a cell to see its details.



3.5.6.2 Show or Hide Items in a Row or Column

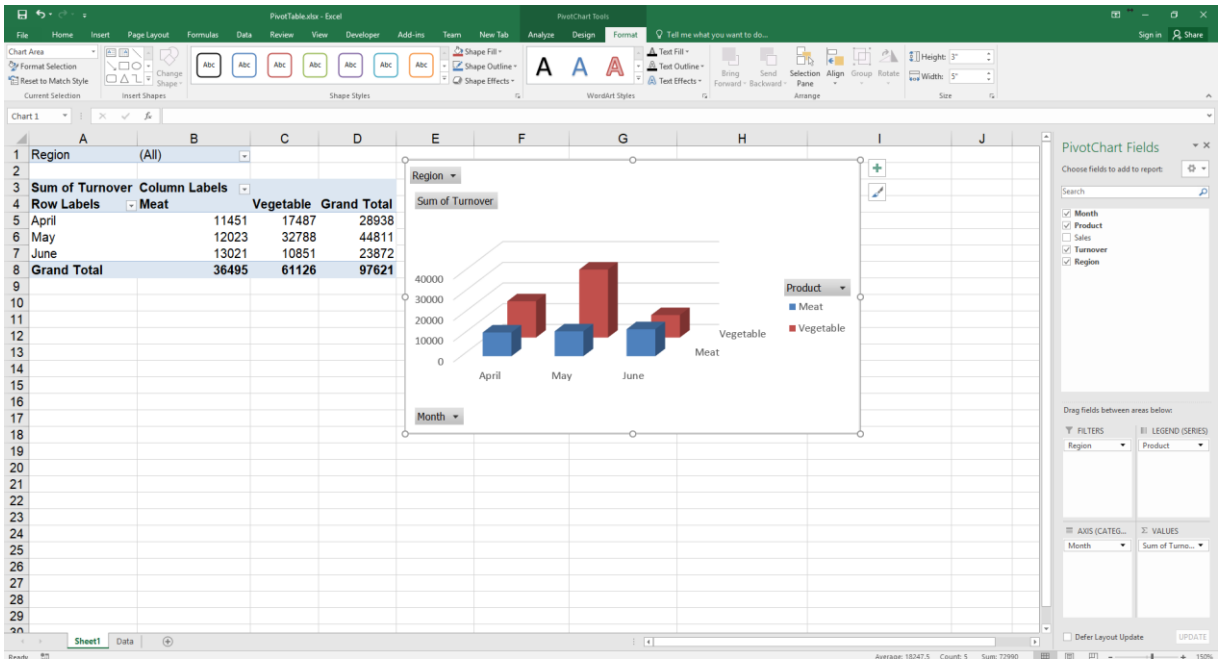
Click the arrow in a field, and then select or clear the check boxes you want.



Region	(All)
Row Labels	Sum of Turnover
April	28938
Meat	11451
Vegetable	17487
May	44811
Meat	12023
Vegetable	32788
June	23872
Meat	13021
Vegetable	10851
Grand Total	97621

3.6 Pivot Chart

A PivotChart report provides a graphical representation of the data in a PivotTable report. You can change the layout and data displayed in a PivotChart report just as you can in a PivotTable report.



Region	(All)		
Sum of Turnover	Column Labels		
Row Labels	Meat	Vegetable	Grand Total
April	11451	17487	28938
May	12023	32788	44811
June	13021	10851	23872
Grand Total	36495	61126	97621

3.6.1 Create a PivotChart

1. Select a cell in a range of cells, or put the insertion point inside of a Microsoft Office Excel table. Make sure that the range of cells has column headings.
2. To create a PivotTable and PivotChart report, on the **Insert** tab, in the **Tables** group, click **PivotTable**, and then click **PivotChart**. Excel displays the **Create PivotTable with PivotChart** dialog box.
3. Specify a location by doing one of the following:
   - To place the PivotTable report in a new worksheet starting at cell A1, click **New Worksheet**.
   - To place the PivotTable report in an existing worksheet, select **Existing Worksheet**, and then specify the first cell in the range of cells where you want to position the PivotTable report.
4. Click **OK**. Excel adds an empty PivotTable report to the specified location and displays the PivotTable Field List so that you can add fields, create a layout, and customize the PivotTable report.