



Excel

Advanced

[Your Company Name]

CustomGuide

EVALUATION
ONLY

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PivotTables

PivotTables are one of the most powerful features in Excel, and they're surprisingly quick to build, too. With properly organized source data, you can create a PivotTable to summarize and analyze data ranges in just a couple of minutes. There are endless possibilities for structuring your data in a PivotTable, so you'll want to have a good idea of what you want to measure or understand before you start.

PivotTables are good for grouping or expanding levels of data, transforming columns into rows and vice versa ("pivoting" data), and filtering and sorting data. They lend themselves particularly well to forming a concise summary from long lists of data. They can be used to build dynamic reports in a fraction of the time it would take to do so manually, helping you make informed decisions.

This module explains how to create PivotTables, modify their structure and formatting, use timelines, and group values. Once you've mastered PivotTables, you'll discover there are a variety of ways you can use them to add value to your projects.

Objectives

- Create PivotTables
- Add Multiple PivotTable Fields
- Change a PivotTable's Calculation
- Add Calculated Fields
- The GETPIVOTDATA Function
- Filter PivotTables
- Timelines
- PivotTable Layout
- Group Values
- Refresh a PivotTable
- Format a PivotTable

Create PivotTables

When faced with a worksheet packed full of data, with many columns and perhaps hundreds or thousands of rows, making sense of it all can be a daunting task. PivotTables help you pull out just the data you need to quickly make informed decisions. They are very flexible, easy to adjust, and can be created and modified with just a few clicks. Don't worry if PivotTables are confusing at first, they will make a lot more sense once you start working with them.

Before you start creating one, it's important to keep a few basic rules in mind:

- Your data should be neatly organized into rows and columns without any blank rows or columns.
- Each column should have the same data type. For example, you shouldn't have a column of prices where some cells have the currency format applied and some have the accounting format applied.
- PivotTables can be created using a cell range or an existing table.

Create a PivotTable

- 1 Select any cell in the data range you want to analyze.
- 2 Click the **Insert** tab on the ribbon.
- 3 Click the **PivotTable** button in the Tables group.

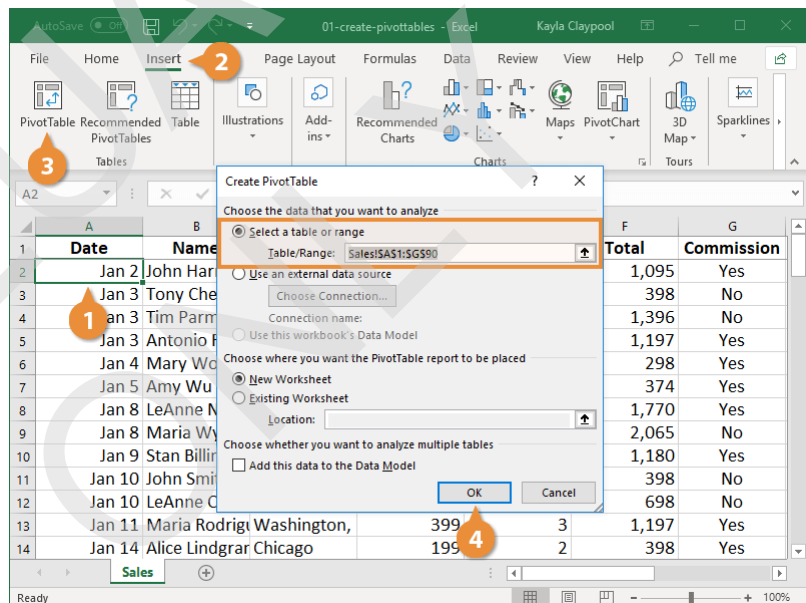
The Create PivotTable dialog box opens. Here, choose which data to analyze and where to place the PivotTable.

If you've already clicked within a data range, the Table/Range field is populated. Verify the correct range is displayed.

Tip: The data range doesn't have to be in the current workbook. Select **Use an external data source** to select data outside the workbook.

- 4 Click **OK**.

An empty PivotTable and task pane appear on a separate worksheet. Next you need to specify the fields you want to appear in your PivotTable.



Add PivotTable Fields

Once you've created your PivotTable, you have to specify the data you want to analyze. The PivotTable Fields pane appears at the right. Under the Search field you see a list of all the possible fields you can use in your PivotTable. These fields are the column headings from the original data source.

To make it a little easier to understand, let's break it down. Say your original data set contains information for ticket sales and includes dates, destinations, prices, the number of sales, sales totals, sales agents, etc., but all you really need to know is how many tickets were sold each month for each destination. You can grab the Destination field and the Date field, add them as rows and columns in the PivotTable, and add a numeric sales field to the values area. The PivotTable will display a subset of the original data, but only include the values you really need to see.

- 1 Click and drag a field to the **Rows** area.
 - 2 Click and drag a field to the **Values** area.
 - 3 If desired, click and drag a field to the **Columns** area.
- Tip:** If you want to filter the PivotTable, add an additional field to the Filters area.

The PivotTable updates to display the values for the fields you've added. The great thing about PivotTables is they are extremely flexible. If the table isn't displaying the data like you want, just click and drag fields in and out of the Rows, Values, and Columns areas until the PivotTable represents the data correctly.

The screenshot shows an Excel spreadsheet with a PivotTable titled 'Sum of Tickets'. The PivotTable has 'Destination' in the Row Labels and 'Months' in the Column Labels. The values are summed tickets for each destination across the months of January. The PivotTable Fields task pane is open on the right, showing 'Destination' in the Rows area, 'Sum of Tickets' in the Values area, and 'Months' in the Columns area. A callout '1, 2 & 3' points to the Fields list, the Rows area, and the Values area respectively.

	1-Jan	2-Jan	3-Jan	4-Jan	5-Jan	8-Jan	9-Jan
Boston			3				
Cancun							
Chicago				2			
Dallas					2		
Duluth					2		
Los Angeles						13	
New York				4			
Philadelphia							
Toronto							
Washington, D.C.			3				
Grand Total	3	9	2	2	13		

Add Multiple PivotTable Fields

When adding fields to the Filters, Columns, Rows, and Values areas of a PivotTable, you aren't limited to just adding one field; you can add as many as you like. However, if you make it too complex, the PivotTable will start to become difficult to consume. You may need to experiment with adding multiple fields to certain areas to see what works best for your set of data. Remember, you can always drag fields out of the area you've added them to in the PivotTable Fields pane to remove them.

Let's refer back to our previous example, where we are only interested in seeing the monthly sales for each destination. After creating the PivotTable, your boss may request to see data for which agents made those sales. Instead of creating a separate PivotTable, you can easily add the Name field as an additional row to expand the data that's represented.

Add an Additional Row or Column Field

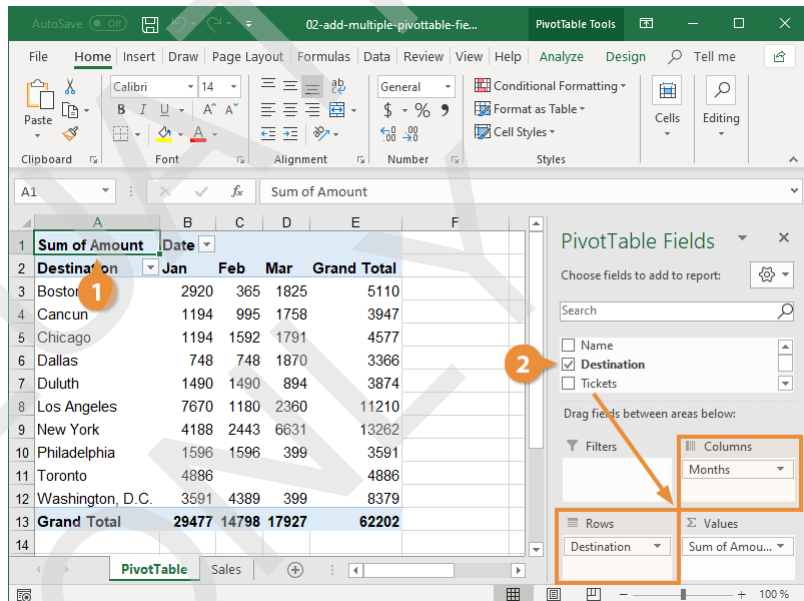
- 1 Click any cell in the PivotTable.
The PivotTable Fields pane appears.

Tip: You can also turn on the PivotTable Fields pane by clicking the **Field List** button on the Analyze tab.

- 2 Click and drag a field to the **Rows** or **Columns** area.

The PivotTable is updated to include the additional values. The order you place the fields in each area in the Fields pane affects the look of the PivotTable. You can drag the field values up or down within an area (the Rows area, for example) to adjust which data appears first.

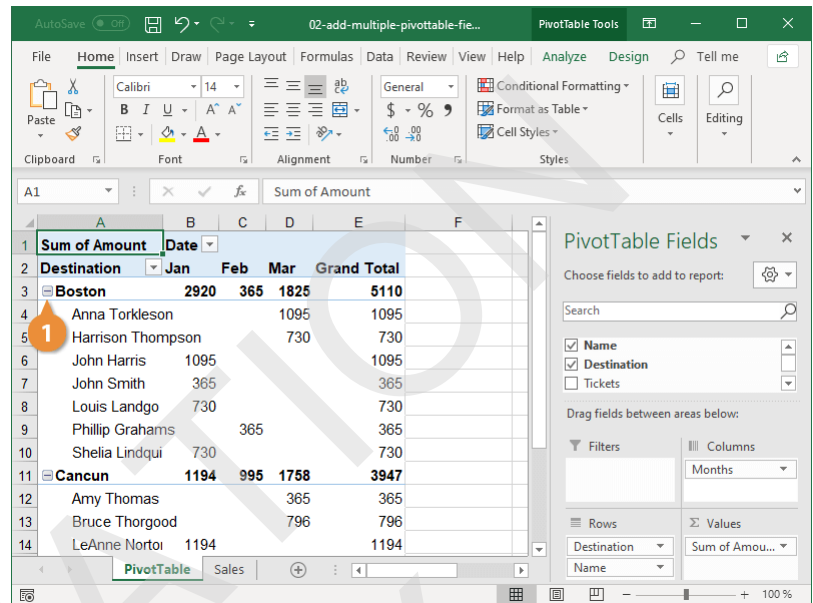
Note: Some fields, when added to a PivotTable, will automatically be displayed as two fields. For example, when adding a date field to the Columns area, Excel will likely group the dates into months automatically instead of displaying each individual date as a column heading. In the Columns area of the PivotTable Fields pane, you'll see two fields—Date and Months—even though you only added a single field.



Expand or Collapse a Heading

Once you've added more than one value to an area, expand and collapse buttons appear for the top-level values in the PivotTable. Use these to change how much of the data is visible at once.

- 1 Click the **Expand** or **Collapse** symbol next to a row or column heading.

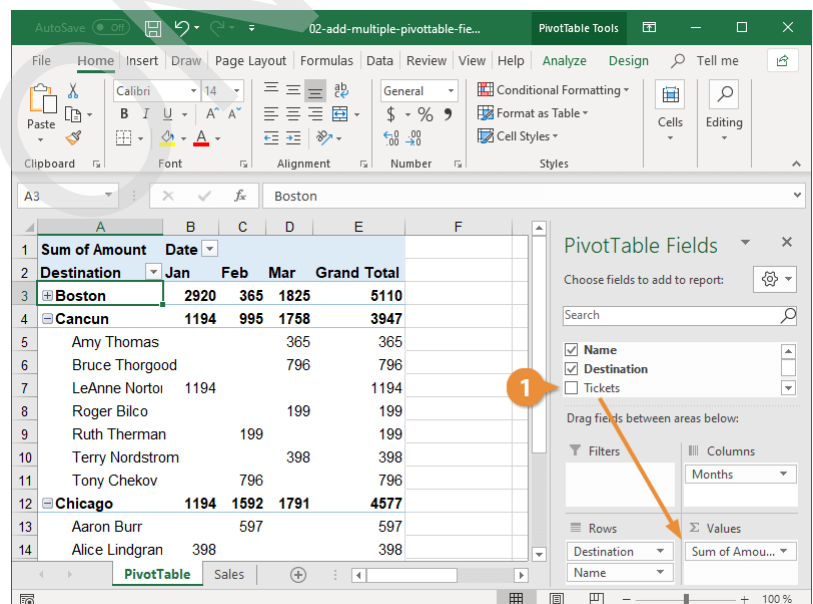


Add an Additional Value Field

If your original set of data has multiple columns with numeric values, you may find yourself adding additional fields to the Values area. If this is the case, the PivotTable will display the sum of one set of data followed by the sum of the second set of data in an adjacent column.

- 1 Click and drag a second field to the **Values** area.

The order in which you place the fields in the Values area is very important. If you add a field and the PivotTable doesn't look right, try adjusting the order of the fields until the PivotTable displays useful data.



Change a PivotTable's Calculation

Besides adjusting the layout of your PivotTable data, you can also change how a PivotTable summarizes values. For example, you might want a PivotTable to display averages instead of totals.

Change PivotTable Calculations

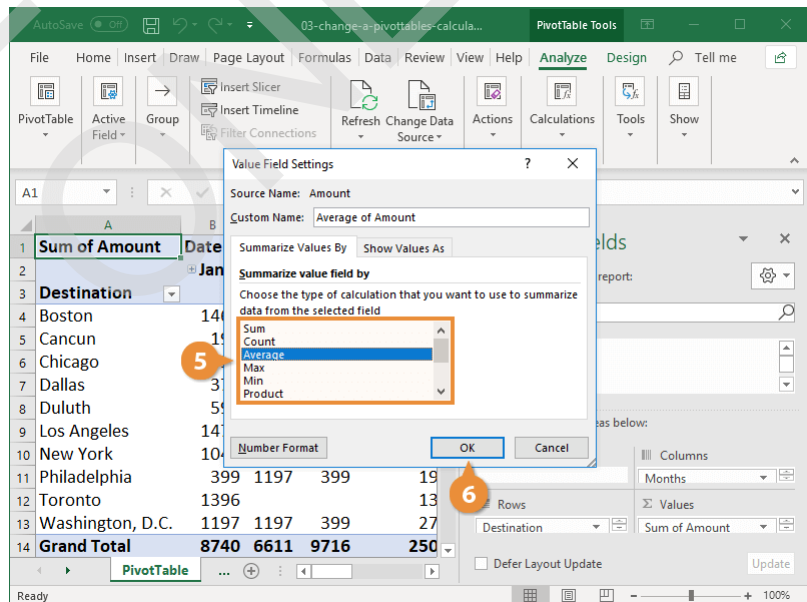
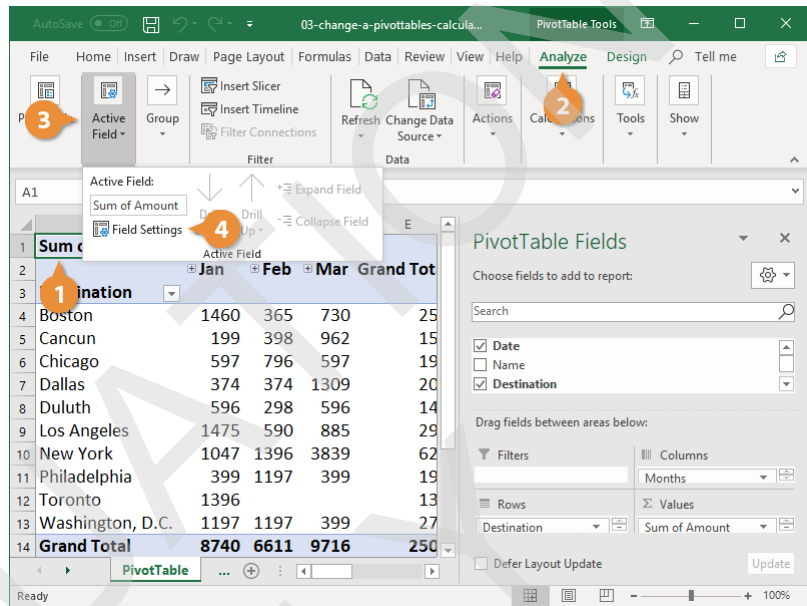
- 1 Click any cell inside the PivotTable.
- 2 Click the **Analyze** tab on the ribbon.
- 3 Click the **Active Field** button on the ribbon.
- 4 Click **Field Settings**.

The Value Field Settings dialog box appears. From here, you can select calculation options including Sum, Count, Average, or Max, among others.

Tip: When a field containing numeric values is added to a PivotTable, Excel automatically calculates the sum.

- 5 Select the type of calculation you want to use.
- 6 Click **OK**.

The summarized data in the PivotTable changes to use the new calculation.



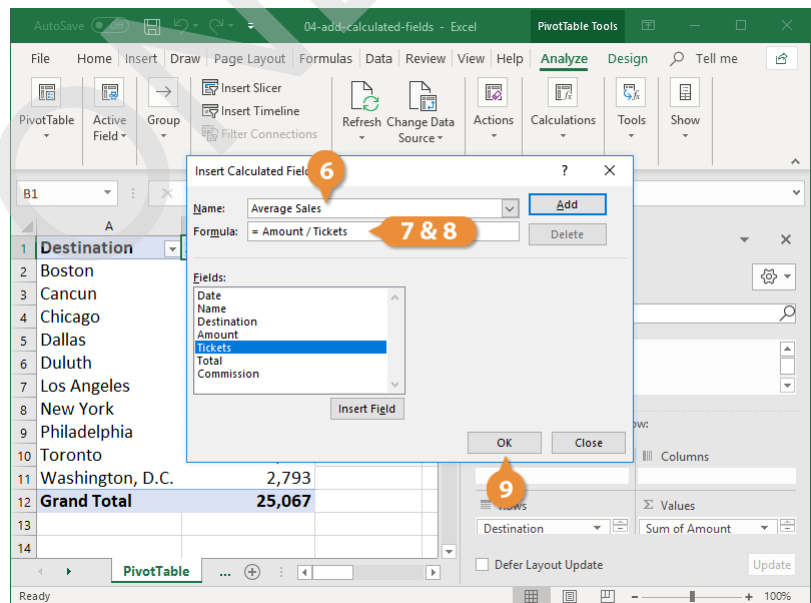
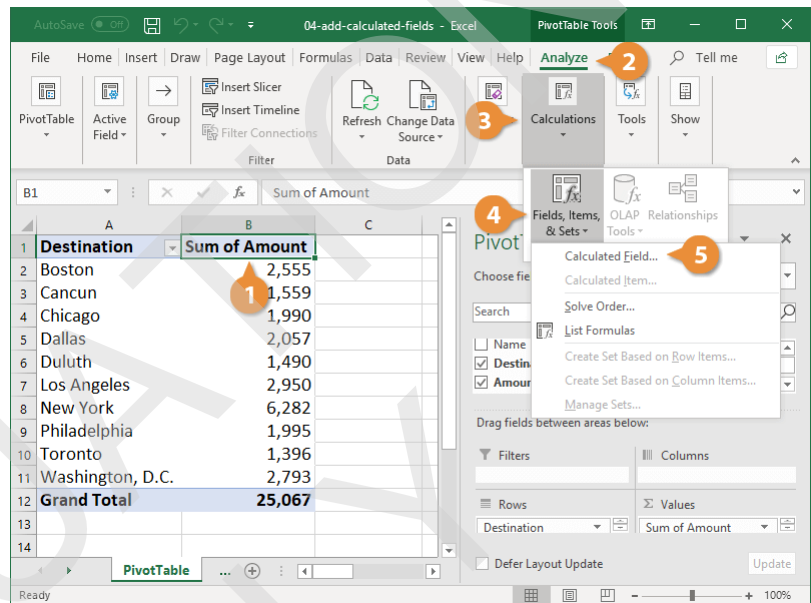
Add Calculated Fields

A calculated field is a new field that performs calculations based on existing fields in your PivotTable. For example, you could use a calculated field to find the average ticket sales using an existing total sales field and a field containing the number of tickets sold.

Create a Calculated Field

- 1 Click a cell in the PivotTable.
- 2 Click the **Analyze** tab.
- 3 Expand the **Calculations** group, if necessary.
- 4 Click the **Fields, Items, & Sets** button.
- 5 Select **Calculated Field**.
The Insert Calculated Field dialog box displays. This is where you'll create and name the field.
- 6 Type a name for the calculated field in the Name field.
- 7 Click in the **Formula** field.
- 8 Enter a calculation using the fields in the list and/or custom values.
- 9 Click **OK**.

The new calculated field is automatically added to the PivotTable.



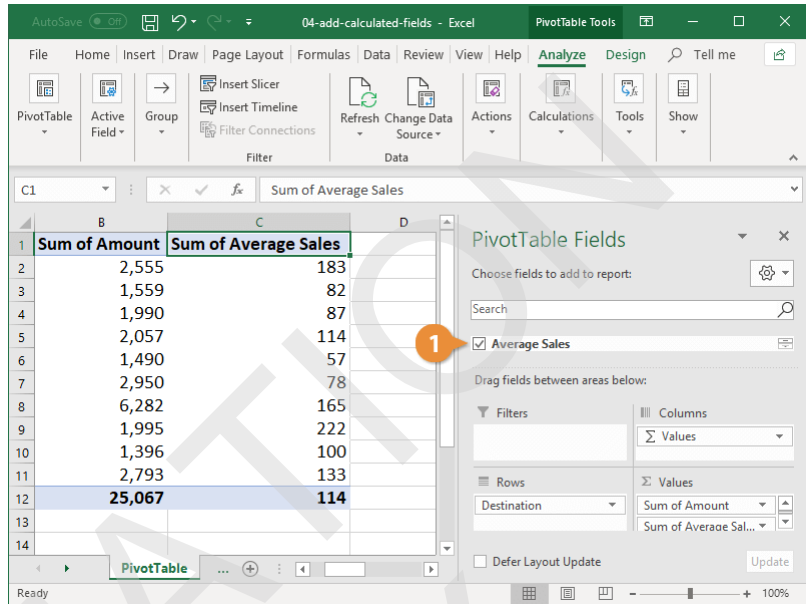
Remove a Calculated Field

If you decide you don't need the calculated field in your PivotTable, it can be removed just like any other PivotTable field.

- 1 Uncheck the calculated field in the PivotTable Fields pane.

The calculated field is removed from the PivotTable; however, it remains in the field list to use again in the future.

Note: If you want to remove the calculated field completely, you need to re-open the Insert Calculated Field dialog box, select the field you created in the Fields list, and click the **Delete** button.



The GETPIVOTDATA Function

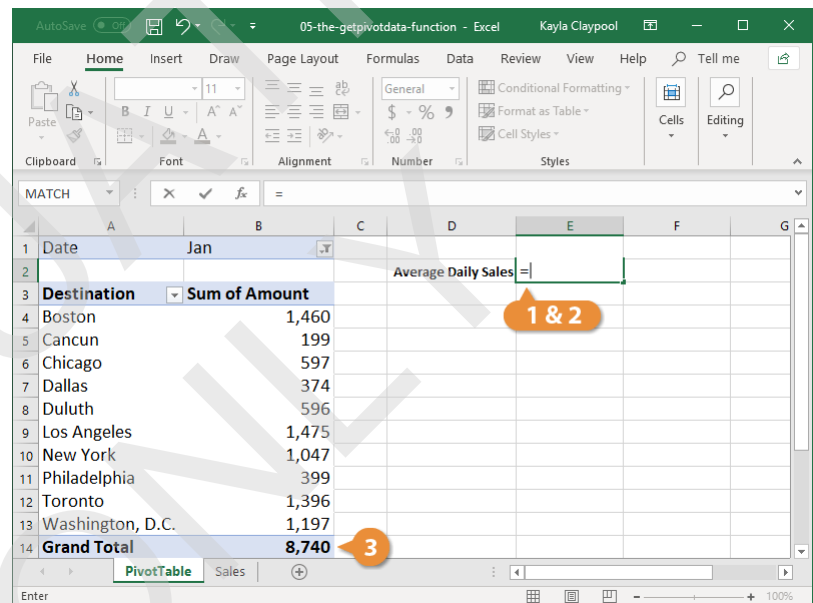
The GETPIVOTDATA function is used to extract data from your PivotTable. You place the function in a cell outside of the PivotTable, and it uses data within the table to perform a calculation. The syntax for the GETPIVOTDATA function looks like this: =GETPIVOTDATA (data_field, pivot_table, [field1, item1], ...). You fill in the function with the following information:

- **data_field:** The name of the field in the PivotTable you want to query.
- **pivot_table:** Any cell located in the PivotTable.
- **field1, item1 (Optional):** The field or item you wish to reference.

Use the GETPIVOTDATA Function

- 1 Click in a cell outside the PivotTable where you want to add the function.
- 2 Type the = sign.
- 3 Click the cell in the PivotTable that contains the data you want to extract.

As soon as you type = and click within the PivotTable, the GETPIVOTDATA function is automatically added.
- 4 (Optional) Expand the function to include additional calculations.



The advantage of using the GETPIVOTDATA function instead of a cell reference is that it records data to ensure the correct value is returned, even if the location of the referenced cell changes when the data in a PivotTable is updated.

Tip: If you happen to be using cube functions as part of your Excel workbooks, note the GETPIVOTDATA function has almost all of the expressions you'll need for your cube functions. You can paste these GETPIVOTDATA values into your cube functions to save time and simplify the process.

Filter PivotTables

Much like you can with basic data ranges and tables in Excel, you can filter a PivotTable to focus in on a smaller portion of data.

For example, instead of showing the sales values for every destination, you can add the Commission field as a report filter to show only the sales for which an agent earned a commission.

Add a Filter Field

1 Click any cell in the PivotTable.

2 Drag a field to the **Filters** area in the PivotTable Fields pane.

The filter field appears at the top of the PivotTable. The text (All) is displayed so you know the data is not currently being filtered.

3 Click the list arrow for the field you've added as a filter.

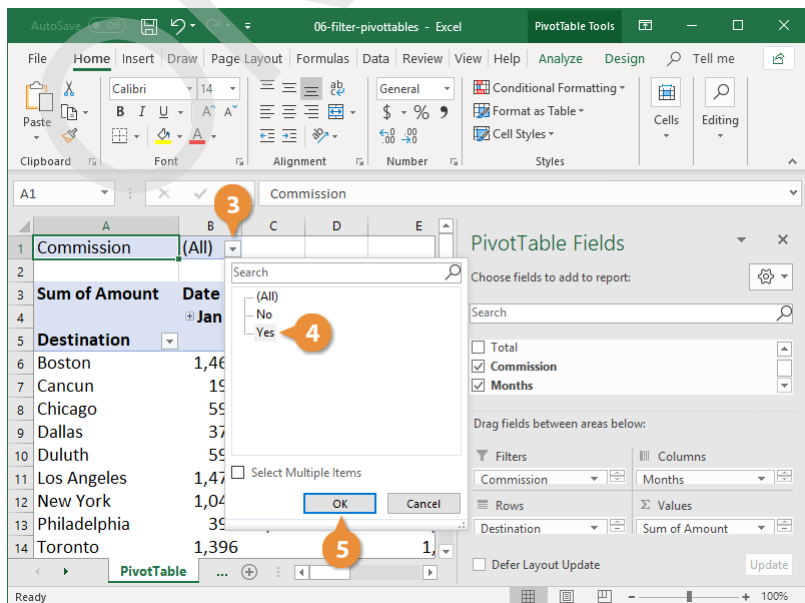
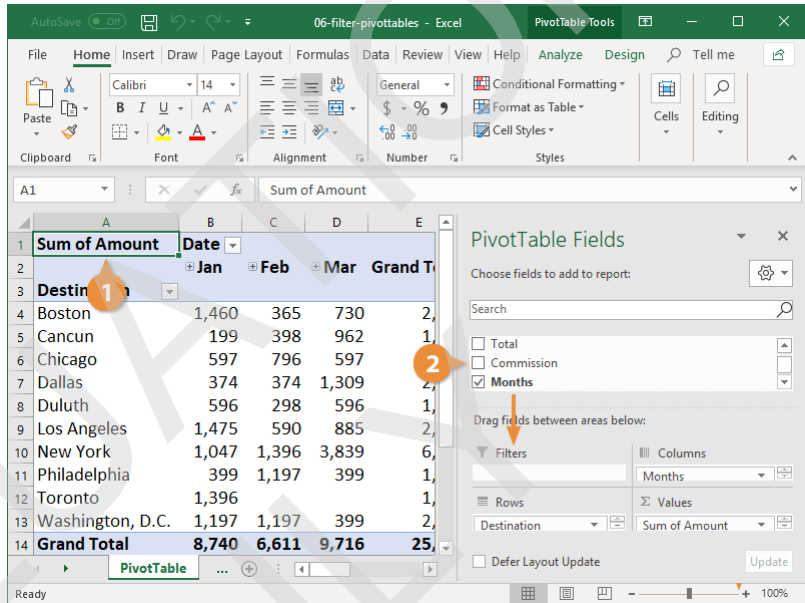
A list of sorting and filtering options appears. The items available in the menu will differ based on the field you've added as a filter. Additionally, a Search field appears at the top of the filter list. If desired, manually type the criteria by which you want to filter.

Tip: You can also filter the row or column headings in a PivotTable by clicking the Row Labels or Column Labels list arrow and selecting only the value(s) you want to display.

4 Select the item(s) you want to use as a filter.

5 Click **OK**.

The PivotTable updates to display only the values that meet the filter criteria.

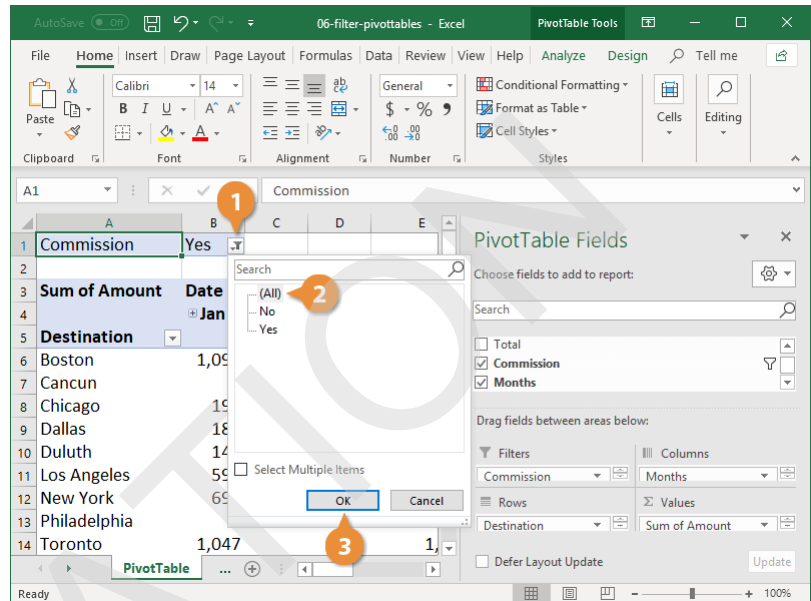


Clear a Filter

Once you're done analyzing the filtered data, clear the filter to see all the data in your PivotTable again.

- 1 Click the **filter** icon next to the filter field.
- 2 Select **All**.
- 3 Click **OK**.

The filter is cleared from the PivotTable, showing all the data once again.

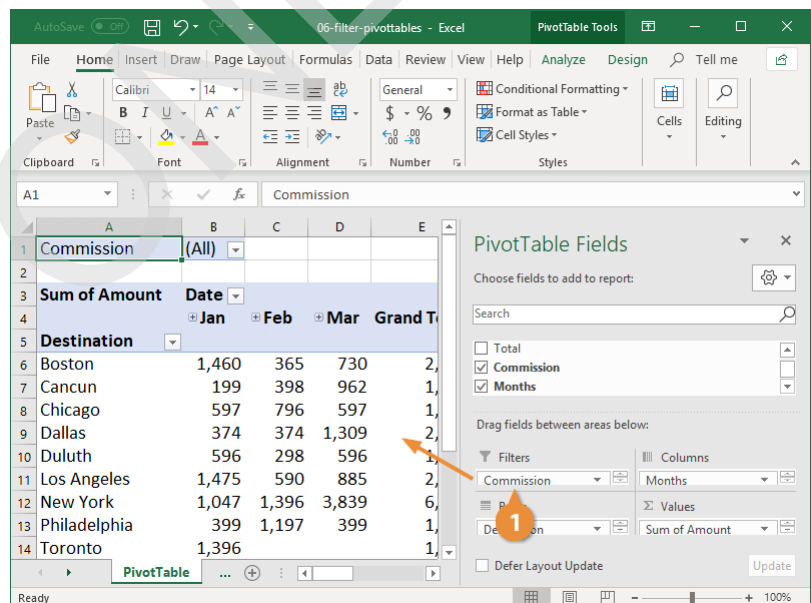


Remove a Filter

When a filter is cleared, all the data is visible; however, the filter remains in the PivotTable to use again. If you want the filter gone completely, you'll need to remove it.

- 1 Click and drag the field out of the Filters area.
- Tip:** You could also uncheck the field in the fields list.

The filter is removed from the PivotTable entirely.



Timelines

Timelines are interactive filters that let you quickly filter by date. They make it quick and easy to see PivotTable data for only the time period you specify. They are similar to slicers in that you can insert them once and keep them with the PivotTable to update at will.

Insert a Timeline

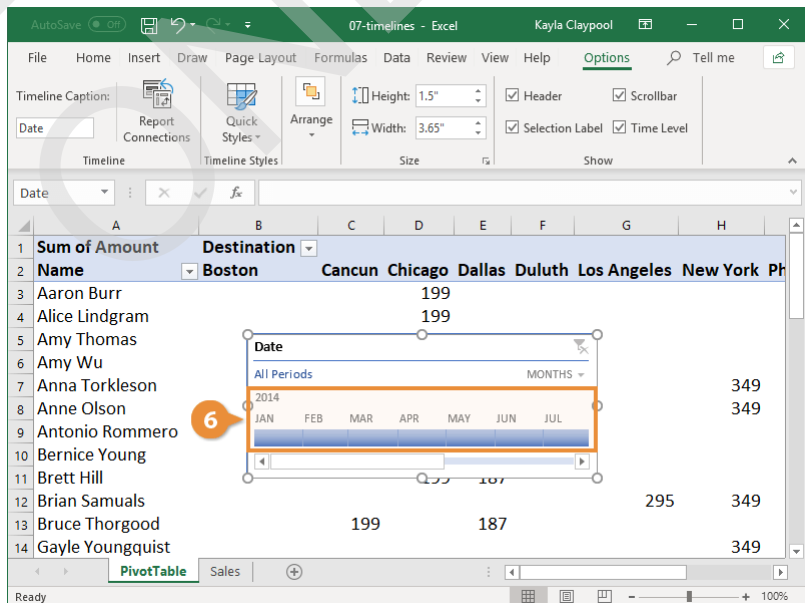
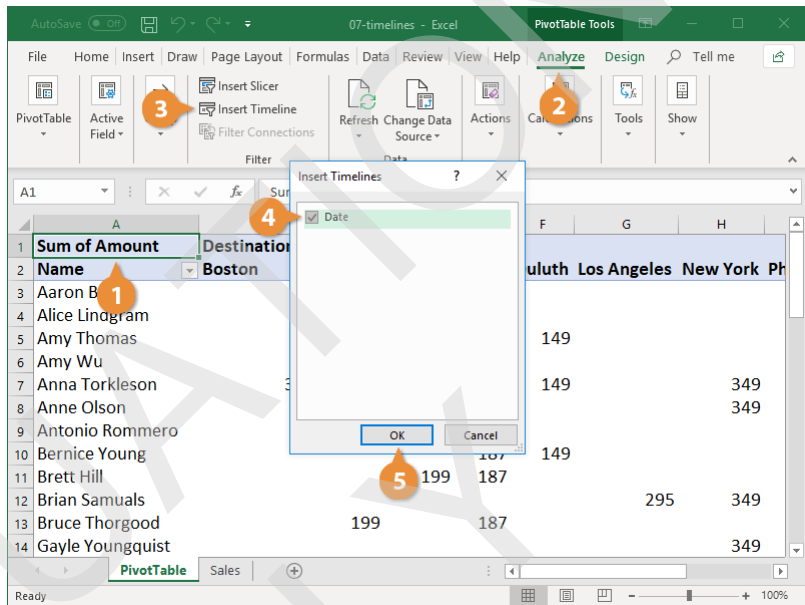
- 1 Click any cell inside the PivotTable.
- 2 Click the **Analyze** tab on the ribbon.
- 3 Click the **Insert Timeline** button.

Tip: You can also insert a Timeline for PivotCharts and cube functions.

The Insert Timelines dialog box appears. It automatically detects the date fields used in the PivotTable and has them available for you to select from. Many times, there will only be one available field.

- 4 Select the date field you want to use for the timeline.
- 5 Click **OK**.
- 6 Select a time span in the Timeline you want the PivotTable to display.

Tip: To select multiple intervals, you can click and drag along the timeline or click the first interval you want to include and hold the Shift key while clicking the last interval in your chosen span.

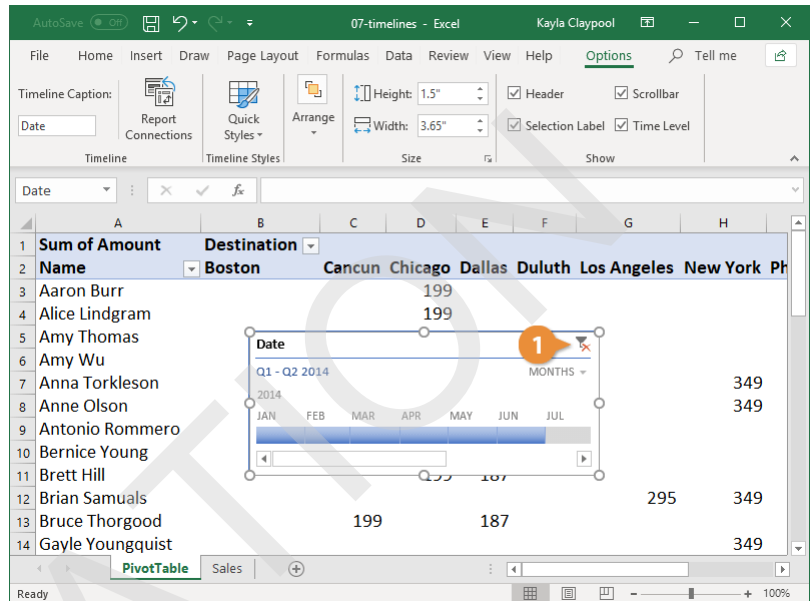


Clear a Timeline

You can clear the Timeline at any point to restore all the data in the PivotTable.

- 1 Click the **Clear Filter** button at the top-right corner of the Timeline.

All the PivotTable data is visible once again.

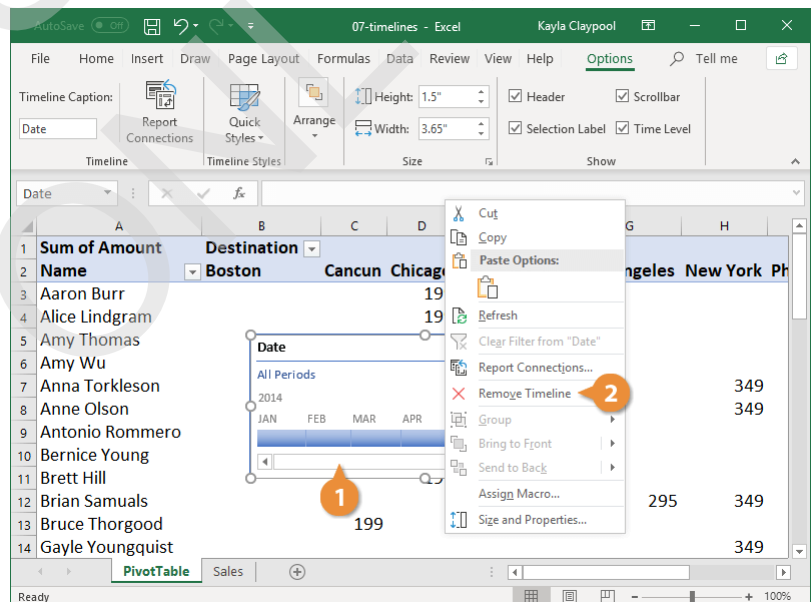


Remove a Timeline

If you no longer need to use the Timeline, it can be removed from the sheet entirely.

- 1 Right-click the timeline.
- 2 Select **Remove Timeline**.

The timeline is removed from your PivotTable.



PivotTable Layout

There are several options for altering the layout of your PivotTable. The Layout group on the Design tab allows you to change what elements appear on the PivotTable.

PivotTable Layout Options

1 Click any cell inside the PivotTable.

The Analyze and Design tabs appear under PivotTable Tools on the ribbon.

2 Click the **Design** tab on the ribbon.

The Layout group has options to change which elements appear in your PivotTable.

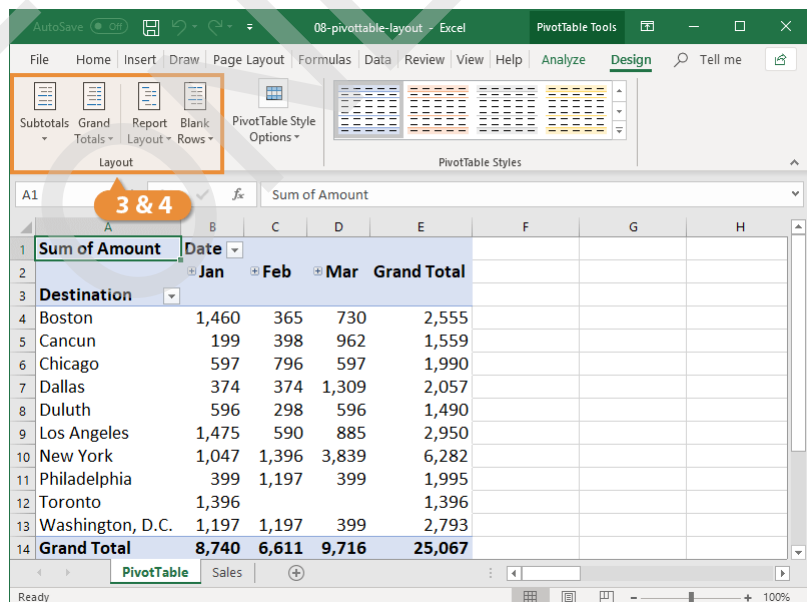
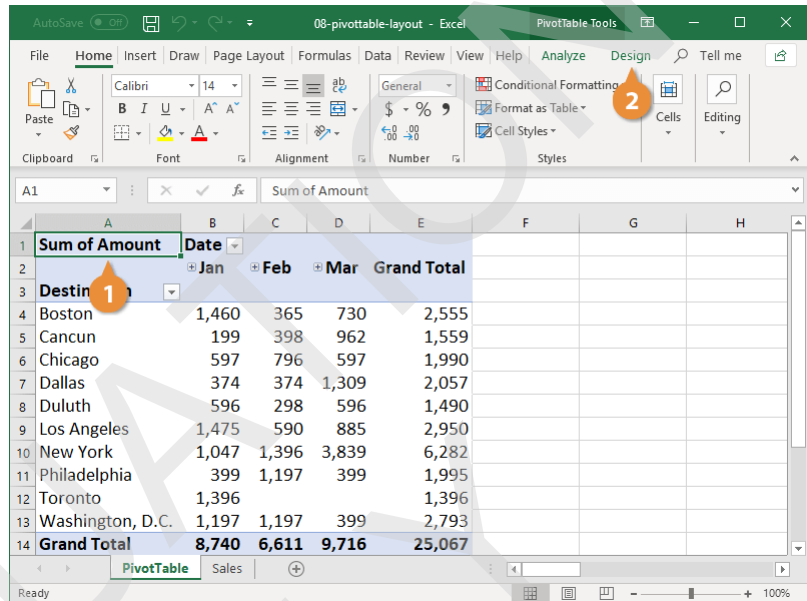
- **Subtotals:** Click to show or hide subtotals, and to specify where to show them.
- **Grand Totals:** Click to show or hide grand totals, and to specify whether they appear for rows, columns, or both.
- **Report Layout:** Show the PivotTable in compact, outline, or tabular form.
- **Blank Rows:** Insert or remove a blank line between each grouped item in the PivotTable.

3 Click the Layout button for the element you want to update.

A list of options appears, depending on the button that was selected.

4 Select an option from the list.

The PivotTable layout is updated based on your selection.



Group Values

You can group PivotTable data in order to set it apart from additional subsets of data. You can group most items, but dates are a common item to group. For example, you may want to group the information in the PivotTable by days, months, quarters, or years.

Group PivotTable Values

1 Click any cell that has a value you want to group by.

2 Click the **Analyze** tab on the ribbon.

3 Click the **Group Field** button.

Tip: You can also right-click a cell and select **Group** from the menu.

The Grouping dialog box appears.

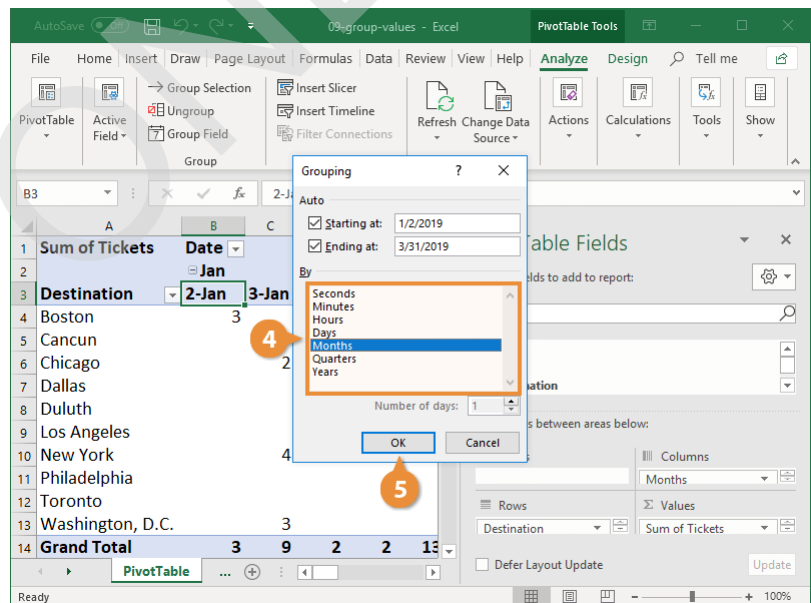
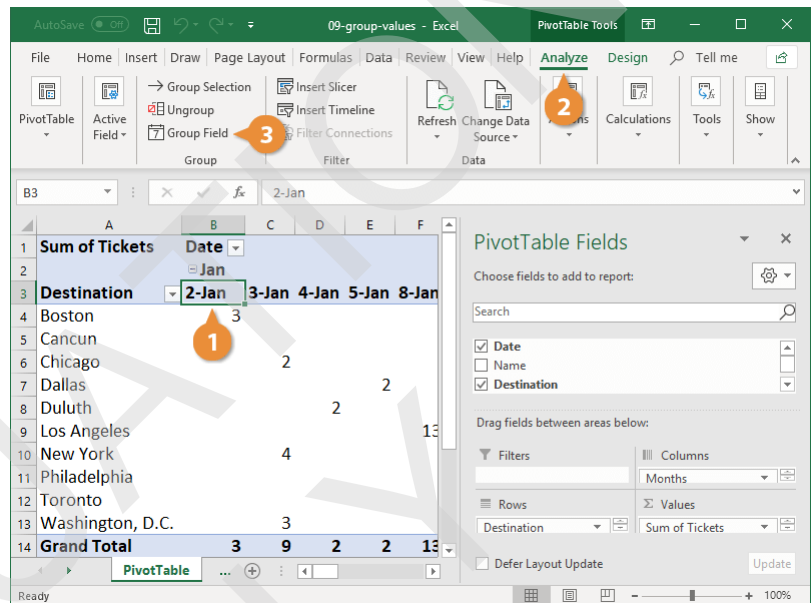
4 Specify how you want to group your PivotTable.

When grouping date values, the default starting and ending dates are the first and last dates in the PivotTable.

Tip: To group dates by weeks, select Days in the By area of the Grouping dialog box and enter 7 in the Number of days field below the list.

5 Click **OK**.

The PivotTable groups together all the data.



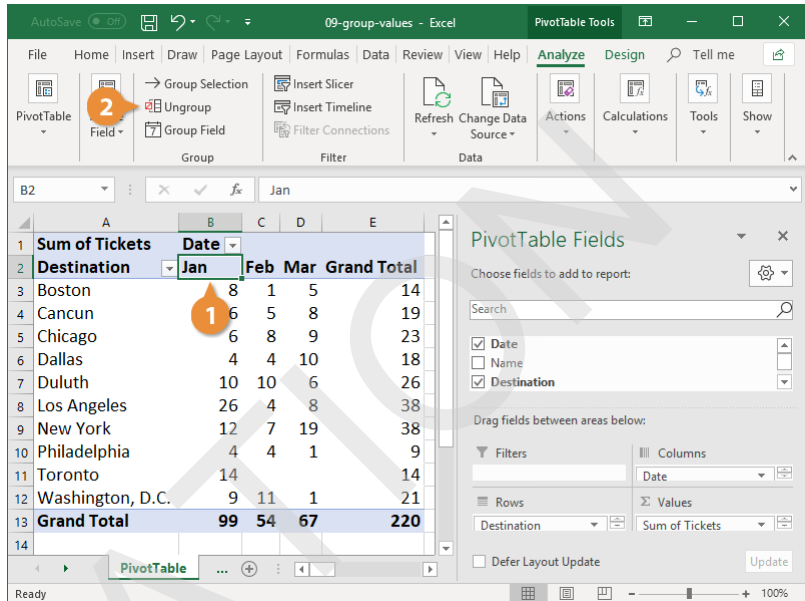
Ungroup PivotTable Values

If you decide you want to see the individual values as column headers again, just ungroup them.

- 1 Click a cell that contains the value you want to ungroup.
- 2 Click the **Ungroup** button on the Analyze tab.

Tip: You can also right-click a cell and select **Ungroup** from the menu.

The grouping is removed from the PivotTable.



Refresh a PivotTable

If you make changes to the source data a PivotTable is based on, the PivotTable isn't automatically updated. Instead, you must manually refresh the PivotTable anytime you change its underlying source data.

Manually Update a PivotTable

- 1 Make a change to the PivotTable's source data.
- 2 Navigate to the PivotTable.
- 3 Click any cell inside the PivotTable.

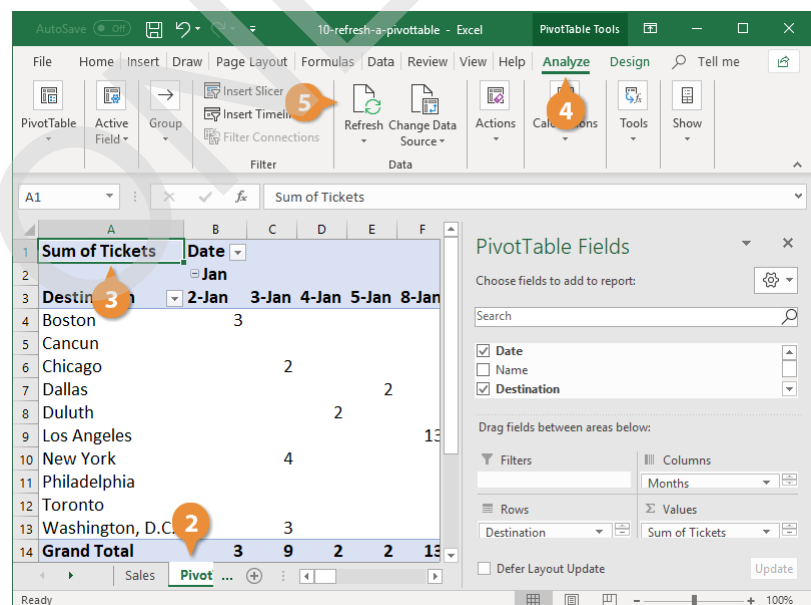
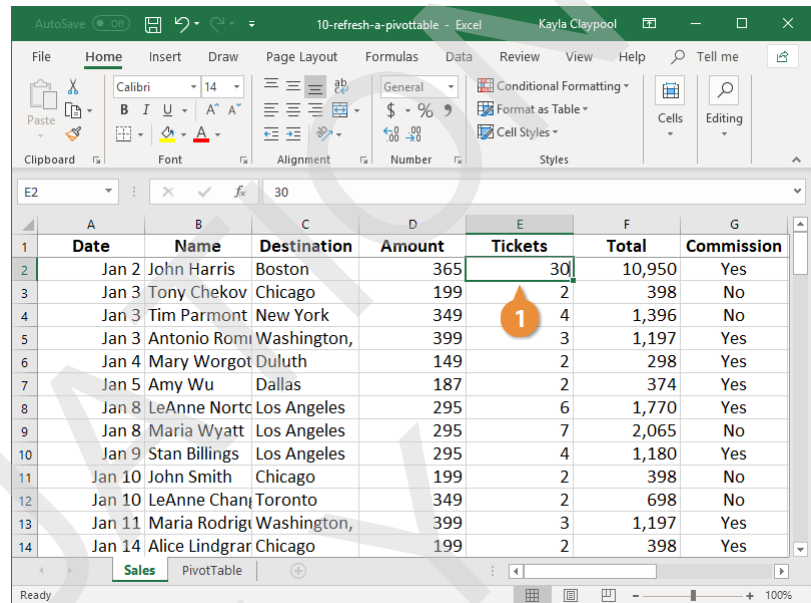
The PivotTable Tools are displayed on the ribbon.

- 4 Click the **Analyze** tab on the ribbon.
- 5 Click the **Refresh** button.

Tip: **Alt + F5** also refreshes the PivotTable.

The PivotTable is refreshed and pulls in any changes made to the source data.

If you have more than one PivotTable in your workbook and you want to update them all at once, instead click the **Refresh** button's list arrow and select **Refresh All** from the menu.



Automatically Update a PivotTable

You can also have Excel refresh the PivotTables in a workbook when a file opens.

1 Click the **PivotTable** button on the Analyze tab.

2 Click **Options**.

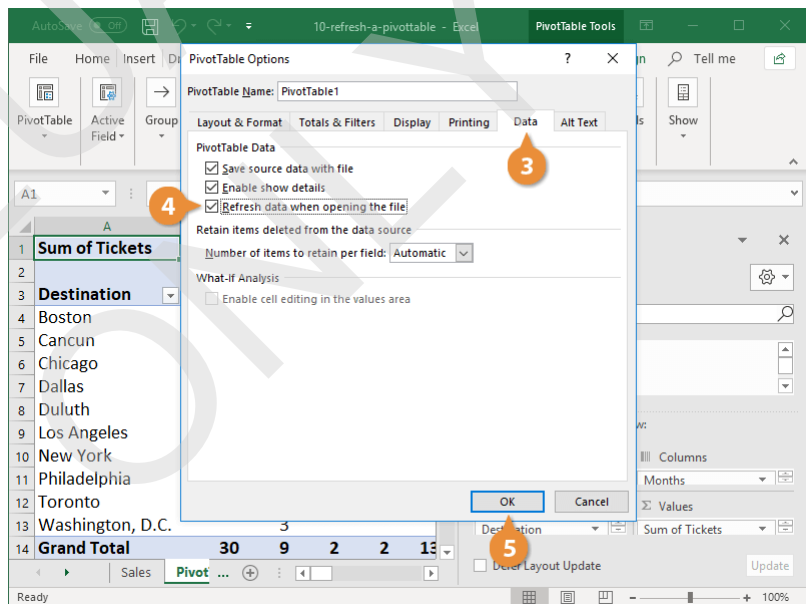
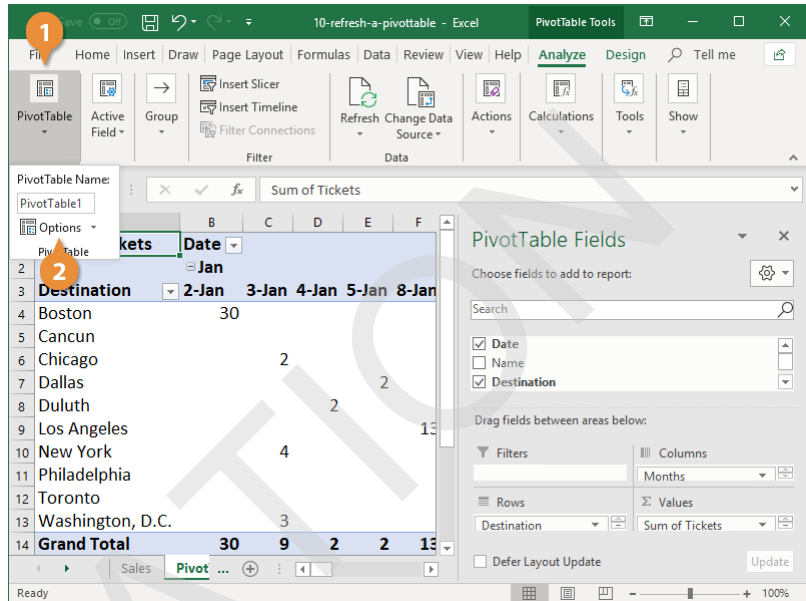
The PivotTable Options dialog box displays. In addition to setting the PivotTable to refresh when opened, there are also various options here for PivotTable settings, such as assigning a name; changing the layout, format, and display settings; and adding alt text.

3 Click the **Data** tab.

4 Check the **Refresh data when opening the file** check box.

5 Click **OK**.

Now any PivotTables in the workbook will automatically refresh each time you open the file.



Format a PivotTable

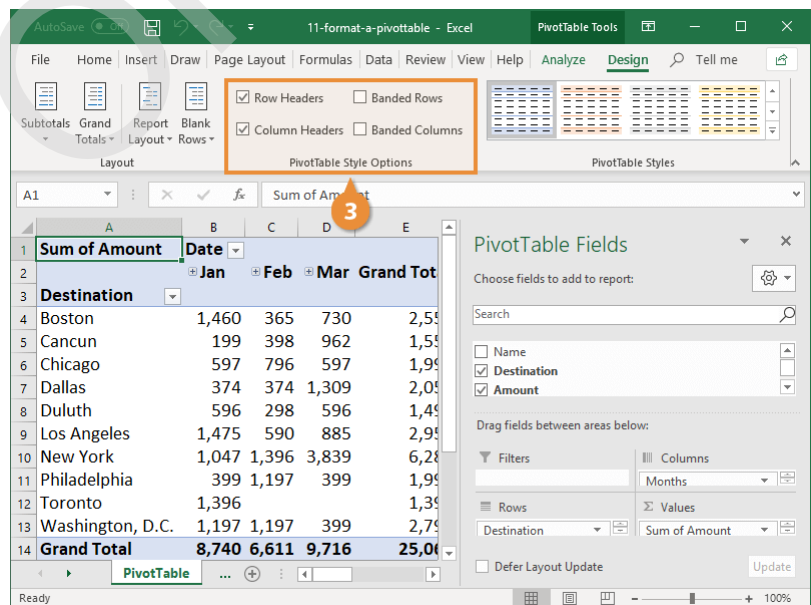
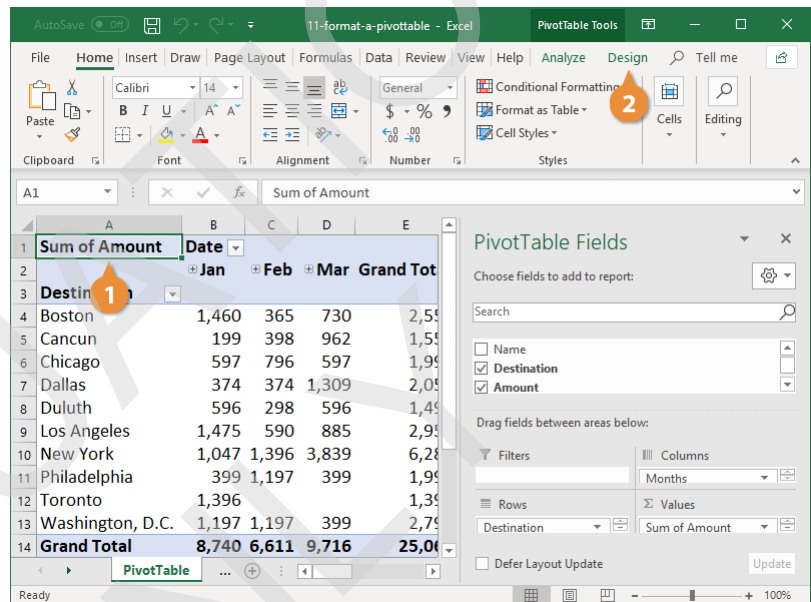
After creating a PivotTable, you may want to enhance the look of it using styles. By default, the column headings, grand total row, and any filters have a light shading applied to the cells based on the workbook's theme colors. However, if you don't like these, there are a variety of other styles to choose from.

Work with Style Options

You can select PivotTable style options that allow you to adjust the format for part of a PivotTable. For example, you can apply special formatting to row headers or make the columns banded.

- 1 Click any cell in the PivotTable.
- 2 Click the **Design** tab.
- 3 Select an option from the PivotTable Style Options group.

- **Row/Column Headers:**
Displays special formatting for the first row or column of the PivotTable.
- **Banded Rows/Columns:**
Applies a different format to alternate rows or columns.



Apply a Built-In Style

Excel also has a gallery of built-in styles you can choose from to quickly format a PivotTable.

1

On the Design tab, select an option in the Styles gallery.

Tip: The PivotTable Styles group will show a few table styles, but to see the rest, you'll need to expand the gallery.

The style is applied to the table, changing the borders, shading, and colors.

Tip: To remove a Table Style, select **Clear** from the More PivotTable Styles menu.

