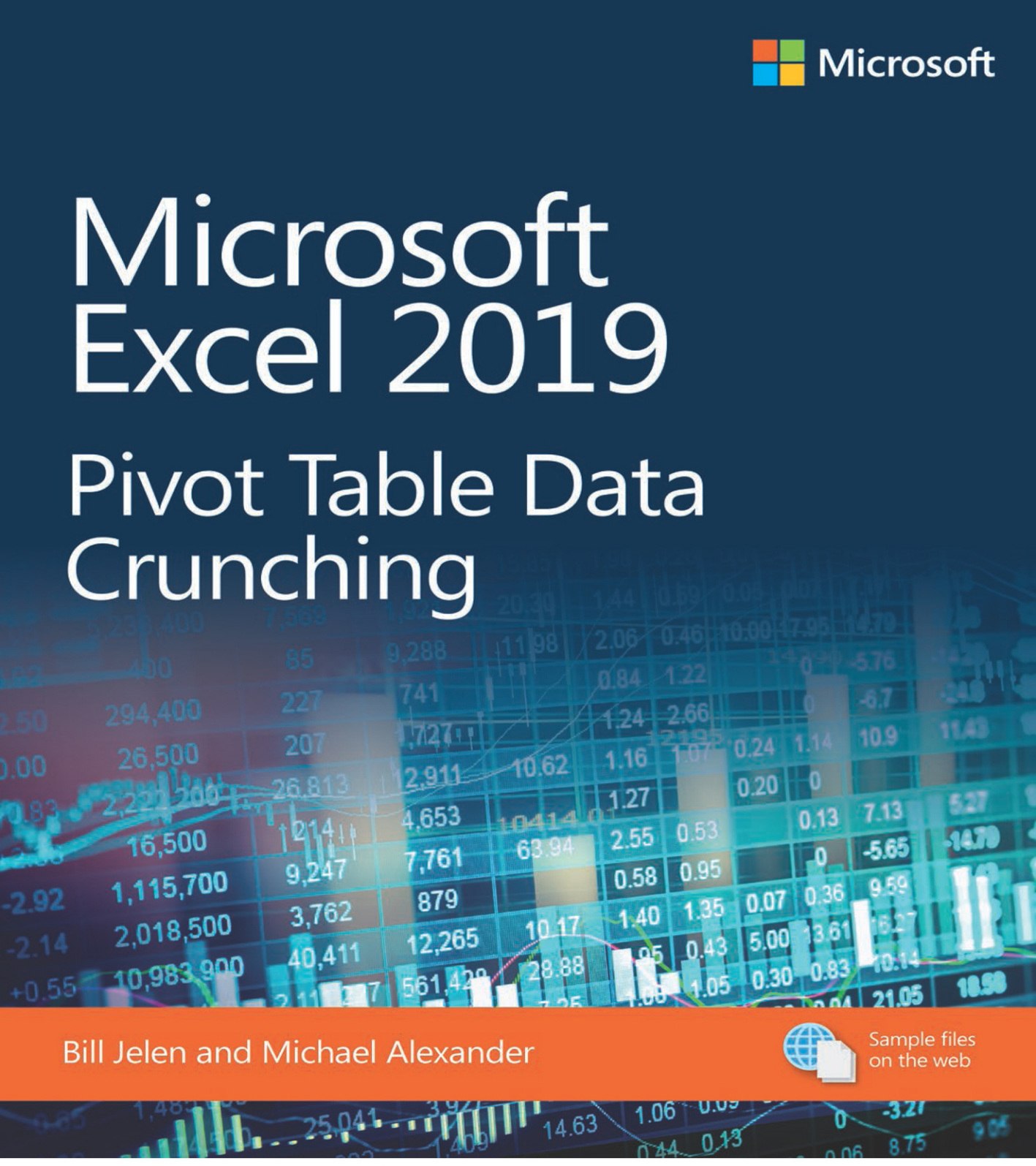
Microsoft

# Microsoft Excel 2019

## Pivot Table Data Crunching



Bill Jelen and Michael Alexander

Sample files on the web

FREE SAMPLE CHAPTER

SHARE WITH OTHERS

www.itbook.store/books/9781509307241

Microsoft

# Microsoft Excel 2019 Pivot Table Data Crunching

Bill Jelen
Michael Alexander

www.itbook.store/books/9781509307241

**Microsoft Excel 2019 Pivot Table Data Crunching**

Published with the authorization of Microsoft Corporation by:

Pearson Education, Inc.

Copyright © 2019 by Pearson Education, Inc.

All rights reserved. Printed in the United States of America. This publication is protected by copyright, and permission must be obtained from the publisher prior to any prohibited reproduction, storage in a retrieval system, or transmission in any form or by any means, electronic, mechanical, photocopying, recording, or likewise. For information regarding permissions, request forms, and the appropriate contacts within the Pearson Education Global Rights & Permissions Department, please visit www.pearsoned.com/permissions/. No patent liability is assumed with respect to the use of the information contained herein. Although every precaution has been taken in the preparation of this book, the publisher and author assume no responsibility for errors or omissions. Nor is any liability assumed for damages resulting from the use of the information contained herein.

ISBN-13: 978-1-5093-0724-1

ISBN-10: 1-5093-0724-9

Library of Congress Control Number: 2018963618

Printed in the United States of America

1 18

**Trademarks**

Microsoft and the trademarks listed at http://www.microsoft.com on the "Trademarks" webpage are trademarks of the Microsoft group of companies. All other marks are property of their respective owners.

**Warning and Disclaimer**

Every effort has been made to make this book as complete and as accurate as possible, but no warranty or fitness is implied. The information provided is on an "as is" basis. The authors and the publisher shall have neither liability nor responsibility to any person or entity with respect to any loss or damages arising from the information contained in this book.

**Special Sales**

For information about buying this title in bulk quantities, or for special sales opportunities (which may include electronic versions; custom cover designs; and content particular to your business, training goals, marketing focus, or branding interests), please contact our corporate sales department at corpsales@pearsoned.com or (800) 382-3419.

For government sales inquiries, please contact governmentsales@pearsoned.com.

For questions about sales outside the U.S., please contact intlcs@pearson.com.

Editor-in-Chief: Brett Bartow

Executive Editor: Loretta Yates

Sponsoring Editor: Charvi Arora

Managing Editor: Sandra Schroeder

Senior Project Editor: Tracey Croom

Project Editor: Charlotte Kughen

Copy Editor: Kitty Wilson

Indexer: Ken Johnson

Proofreader: Paula Lowell

Technical Editor: Bob Umlas

Publishing Coordinator: Cindy Teeters

Cover Designer: Twist Creative, Seattle

Compositor: Bronkella Publishing LLC

Graphics: TJ Graham Art

www.itbook.store/books/9781509307241

*To Ashvina Sharma and his team at Microsoft. Thanks for Pivot Table Defaults!*

*—Bill Jelen*

*To my 12 fans at datapigtechnologies.com.*

*—Mike Alexander*

www.itbook.store/books/9781509307241

www.itbook.store/books/9781509307241

# Contents at a Glance


| | | |
|---|---|---|
| | *Introduction* | *xxiii* |
| CHAPTER 1 | **Pivot table fundamentals** | **1** |
| CHAPTER 2 | **Creating a basic pivot table** | **11** |
| CHAPTER 3 | **Customizing a pivot table** | **43** |
| CHAPTER 4 | **Grouping, sorting, and filtering pivot data** | **75** |
| CHAPTER 5 | **Performing calculations in pivot tables** | **121** |
| CHAPTER 6 | **Using pivot charts and other visualizations** | **149** |
| CHAPTER 7 | **Analyzing disparate data sources with pivot tables** | **175** |
| CHAPTER 8 | **Sharing dashboards with Power BI** | **207** |
| CHAPTER 9 | **Using cube formulas with the Data Model or OLAP data** | **231** |
| CHAPTER 10 | **Unlocking features with the Data Model and Power Pivot** | **261** |
| CHAPTER 11 | **Analyzing geographic data with 3D Map** | **289** |
| CHAPTER 12 | **Enhancing pivot table reports with macros** | **303** |
| CHAPTER 13 | **Using VBA to create pivot tables** | **323** |
| CHAPTER 14 | **Advanced pivot table tips and techniques** | **387** |
| CHAPTER 15 | **Dr. Jekyll and Mr. GetPivotData** | **425** |
| | *Index* | *443* |




www.itbook.store/books/9781509307241

www.itbook.store/books/9781509307241

# Contents

*Introduction* . . . . . *xxiii*

**Chapter 1 Pivot table fundamentals** **1**

Why you should use a pivot table . . . . . **1**

When to use a pivot table . . . . . **3**

Anatomy of a pivot table . . . . . **4**

Values area . . . . . **4**

Rows area . . . . . **5**

Columns area . . . . . **5**

Filters area . . . . . **6**

Pivot tables behind the scenes . . . . . **6**

Pivot table backward compatibility . . . . . **7**

A word about compatibility . . . . . **7**

Next steps . . . . . **9**

**Chapter 2 Creating a basic pivot table** **11**

Ensuring that data is in a Tabular layout . . . . . **12**

Avoiding storing data in section headings . . . . . **12**

Avoiding repeating groups as columns . . . . . **13**

Eliminating gaps and blank cells in the data source . . . . . **14**

Applying appropriate type formatting to fields . . . . . **14**

Summary of good data source design . . . . . **14**

How to create a basic pivot table . . . . . **19**

Adding fields to a report . . . . . **22**

Fundamentals of laying out a pivot table report . . . . . **22**

Adding layers to a pivot table . . . . . **25**

Rearranging a pivot table . . . . . **25**

Creating a report filter . . . . . **27**

Understanding the Recommended PivotTable and the Ideas features . . . **28**

Using slicers . . . . . **31**

Creating a standard slicer . . . . . **31**

Creating a Timeline slicer . . . . . **34**



www.itbook.store/books/9781509307241

Keeping up with changes in the data source ..... 36
Dealing with changes made to the existing data source ..... 36
Dealing with an expanded data source range due to the addition of rows or columns ..... 37
Sharing the pivot cache ..... 37
Side effects of sharing a pivot cache ..... 39
Saving time with new PivotTable tools ..... 39
Deferring layout updates ..... 39
Starting over with one click ..... 40
Relocating a pivot table ..... 41
Next steps ..... 41

**Chapter 3 Customizing a pivot table** 43

Making common cosmetic changes ..... 44
Applying a table style to restore gridlines ..... 45
Changing the number format to add thousands separators ..... 46
Replacing blanks with zeros ..... 47
Changing a field name ..... 49
Making report layout changes ..... 50
Using the Compact layout ..... 51
Using the Outline layout ..... 52
Using the traditional Tabular layout ..... 53
Controlling blank lines, grand totals, and other settings ..... 56
Customizing a pivot table's appearance with styles and themes ..... 59
Customizing a style ..... 60
Modifying styles with document themes ..... 61
Changing summary calculations ..... 62
The Excel team fixed the Count Of Revenue bug ..... 62
Changing the calculation in a value field ..... 63
Showing percentage of total ..... 66
Using % Of to compare one line to another line ..... 66
Showing rank ..... 67
Tracking running total and percentage of running total ..... 67
Displaying a change from a previous field ..... 68
Tracking the percentage of a parent item ..... 69
Tracking relative importance with the Index option ..... 69



www.itbook.store/books/9781509307241

Adding and removing subtotals . . . . . 70
Suppressing subtotals with many row fields . . . . . 70
Adding multiple subtotals for one field . . . . . 71
Formatting one cell is new in Office 365 . . . . . 72
Next steps . . . . . 74

**Chapter 4 Grouping, sorting, and filtering pivot data** 75

Using the PivotTable Fields list. . . . . 75
Docking and undocking the PivotTable Fields list . . . . . 77
Rearranging the PivotTable Fields list . . . . . 77
Using the Areas section drop-downs . . . . . 78
Sorting in a pivot table. . . . . 79
Sorting customers into high-to-low sequence based on revenue . . 79
Using a manual sort sequence. . . . . 82
Using a custom list for sorting . . . . . 84
Filtering a pivot table: an overview . . . . . 86
Using filters for row and column fields . . . . . 88
Filtering using the check boxes . . . . . 88
Filtering using the search box . . . . . 89
Filtering using the Label Filters option . . . . . 90
Filtering a Label column using information in a Values column . . . . 91
Creating a top-five report using the Top 10 filter. . . . . 93
Filtering using the Date filters in the Label drop-down menu. . . . . 94
Filtering using the Filters area . . . . . 96
Adding fields to the Filters area. . . . . 96
Choosing one item from a filter . . . . . 96
Choosing multiple items from a filter . . . . . 97
Replicating a pivot table report for each item in a filter . . . . . 97
Filtering using slicers and timelines . . . . . 99
Using timelines to filter by date. . . . . 101
Driving multiple pivot tables from one set of slicers . . . . . 102
Grouping and creating hierarchies in a pivot table. . . . . 104
Grouping numeric fields . . . . . 104
Grouping date fields manually . . . . . 108
Including years when grouping by months. . . . . 110



www.itbook.store/books/9781509307241

Grouping date fields by week ... 110
AutoGrouping pivot table dates ... 111
Understanding how Excel decides what to AutoGroup ... 111
Using AutoGroup ... 112
Creating an easy year-over-year report ... 113
Creating hierarchies ... 116
Next steps ... 119

**Chapter 5 Performing calculations in pivot tables** 121

Introducing calculated fields and calculated items ... 121
Method 1: Manually add a calculated field to the data source ... 122
Method 2: Use a formula outside a pivot table to create a calculated field ... 123
Method 3: Insert a calculated field directly into a pivot table ... 124
Creating a calculated field ... 125
Creating a calculated item ... 133
Understanding the rules and shortcomings of pivot table calculations ... 137
Remembering the order of operator precedence ... 138
Using cell references and named ranges ... 139
Using worksheet functions ... 139
Using constants ... 139
Referencing totals ... 139
Rules specific to calculated fields ... 139
Rules specific to calculated items ... 145
Managing and maintaining pivot table calculations ... 146
Editing and deleting pivot table calculations ... 146
Changing the solve order of calculated items ... 147
Documenting formulas ... 148
Next steps ... 148

**Chapter 6 Using pivot charts and other visualizations** 149

What is a pivot chart...really? ... 149
Creating a pivot chart ... 150
Understanding pivot field buttons ... 152
Creating a Pivot Chart from Scratch ... 153



www.itbook.store/books/9781509307241

Keeping pivot chart rules in mind. . . . . 154
Changes in the underlying pivot table affect a pivot chart . . . . . 154
Placement of data fields in a pivot table might not be best suited for a pivot chart . . . . . 154
A few formatting limitations still exist in Excel 2019 . . . . . 156
Examining alternatives to using pivot charts . . . . . 161
Method 1: Turn the pivot table into hard values. . . . . 162
Method 2: Delete the underlying pivot table . . . . . 162
Method 3: Distribute a picture of the pivot chart . . . . . 163
Method 4: Use cells linked back to the pivot table as the source data for the chart . . . . . 163
Using conditional formatting with pivot tables . . . . . 165
An example of using conditional formatting . . . . . 165
Preprogrammed scenarios for condition levels . . . . . 167
Creating custom conditional formatting rules . . . . . 168
Using Power BI Custom Visuals in Excel . . . . . 173
Next steps . . . . . 174

**Chapter 7 Analyzing disparate data sources with pivot tables 175**

Using the Data Model . . . . . 175
Building out your first Data Model. . . . . 176
Managing relationships in the Data Model . . . . . 179
Adding a new table to the Data Model. . . . . 180
Limitations of the Data Model . . . . . 180
Building a pivot table using external data sources . . . . . 181
Building a pivot table with Microsoft Access data. . . . . 181
Building a pivot table with SQL Server data . . . . . 184
Leveraging Power Query to extract and transform data. . . . . 187
Power Query basics . . . . . 188
Understanding applied steps. . . . . 194
Refreshing Power Query data . . . . . 196
Managing existing queries . . . . . 196
Understanding column-level actions . . . . . 198
Understanding table actions . . . . . 200



www.itbook.store/books/9781509307241

Power Query connection types . . . . . 201
One more Power Query example . . . . . 204
Next steps . . . . . 206

**Chapter 8 Sharing dashboards with Power BI** 207

Getting started with Power BI Desktop . . . . . 207
Preparing data in Excel . . . . . 208
Importing data to Power BI . . . . . 208
Getting oriented to Power BI . . . . . 209
Preparing data in Power BI . . . . . 210
Defining synonyms in Power BI Desktop . . . . . 213
Building an interactive report with Power BI Desktop . . . . . 213
Building your first visualization . . . . . 213
Building your second visualization . . . . . 217
Cross-filtering charts . . . . . 218
Creating a drill-down hierarchy . . . . . 219
Importing a custom visualization . . . . . 221
Publishing to Power BI . . . . . 222
Designing for the mobile phone . . . . . 222
Publishing to a workspace . . . . . 223
Using artificial intelligence for Insights . . . . . 224
Using Q&A to query data . . . . . 225
Designing a workbook as an interactive web page . . . . . 226
Sharing a link to a web workbook . . . . . 229
Next steps . . . . . 229

**Chapter 9 Using cube formulas with the Data Model or OLAP data** 231

Converting your pivot table to cube formulas . . . . . 232
Introduction to OLAP . . . . . 239
Connecting to an OLAP cube . . . . . 239
Understanding the structure of an OLAP cube . . . . . 242
Understanding the limitations of OLAP pivot tables . . . . . 244
Creating an offline cube . . . . . 245



www.itbook.store/books/9781509307241

Breaking out of the pivot table mold with cube functions . . . . . 248
Exploring cube functions . . . . . 248
Adding calculations to OLAP pivot tables . . . . . 250
Creating calculated measures . . . . . 251
Creating calculated members . . . . . 254
Managing OLAP calculations . . . . . 257
Performing what-if analysis with OLAP data . . . . . 258
Next steps . . . . . 260

**Chapter 10 Unlocking features with the Data Model and Power Pivot** 261

Replacing VLOOKUP with the Data Model . . . . . 261
Unlocking hidden features with the Data Model . . . . . 266
Counting Distinct in a pivot table . . . . . 266
Including filtered items in totals . . . . . 268
Creating median in a pivot table using DAX measures . . . . . 269
Reporting text in the Values area . . . . . 272
Processing big data with Power Query . . . . . 272
Adding a new column using Power Query . . . . . 275
Power Query is like the Macro Recorder but better . . . . . 276
Avoiding the Excel grid by loading to the Data Model . . . . . 277
Adding a linked table . . . . . 278
Defining a relationship between two tables . . . . . 279
Adding calculated columns in the Power Pivot grid . . . . . 281
Sorting one column by another column . . . . . 282
Creating a pivot table from the Data Model . . . . . 283
Using advanced Power Pivot techniques . . . . . 284
Handling complicated relationships . . . . . 284
Using time intelligence . . . . . 285
Overcoming limitations of the Data Model . . . . . 286
Enjoying other benefits of Power Pivot . . . . . 287
Learning more . . . . . 287
Next steps . . . . . 287



www.itbook.store/books/9781509307241

**Chapter 11 Analyzing geographic data with 3D Map** 289

Analyzing geographic data with 3D Map ... 289
Preparing data for 3D Map ... 289
Geocoding data ... 290
Building a column chart in 3D Map ... 292
Navigating through the map ... 292
Labeling individual points ... 294
Building pie or bubble charts on a map ... 294
Using heat maps and region maps ... 294
Exploring 3D Map settings ... 295
Fine-tuning 3D Map ... 296
Combining two data sets ... 297
Animating data over time ... 297
Building a tour ... 298
Creating a video from 3D Map ... 299
Next steps ... 302

**Chapter 12 Enhancing pivot table reports with macros** 303

Using macros with pivot table reports ... 303
Recording a macro ... 304
Creating a user interface with form controls ... 306
Altering a recorded macro to add functionality ... 308
Inserting a scrollbar form control ... 309
Creating a macro using Power Query ... 312
Next steps ... 321

**Chapter 13 Using VBA to create pivot tables** 323

Enabling VBA in your copy of Excel ... 323
Using a file format that enables macros ... 324
Visual Basic Editor ... 325
Visual Basic tools ... 326
The macro recorder ... 326
Understanding object-oriented code ... 327



www.itbook.store/books/9781509307241

Learning tricks of the trade. . . . . **327**
Writing code to handle a data range of any size . . . . . **327**
Using super-variables: Object variables . . . . . **328**
Using With and End With to shorten code. . . . . **329**
Understanding versions. . . . . **330**
Building a pivot table in Excel VBA. . . . . **330**
Adding fields to the data area . . . . . **332**
Formatting the pivot table . . . . . **333**
Dealing with limitations of pivot tables . . . . . **336**
Filling blank cells in the data area. . . . . **336**
Filling blank cells in the row area . . . . . **336**
Preventing errors from inserting or deleting cells. . . . . **336**
Controlling totals . . . . . **337**
Converting a pivot table to values . . . . . **338**
Pivot table 201: Creating a report showing revenue by category. . . . . **341**
Ensuring that Tabular layout is utilized . . . . . **344**
Rolling daily dates up to years . . . . . **344**
Eliminating blank cells . . . . . **346**
Controlling the sort order with AutoSort . . . . . **347**
Changing the default number format. . . . . **347**
Suppressing subtotals for multiple row fields. . . . . **348**
Copying a finished pivot table as values to a new workbook . . . . **349**
Handling final formatting . . . . . **350**
Adding subtotals to get page breaks. . . . . **350**
Putting it all together . . . . . **352**
Calculating with a pivot table . . . . . **355**
Addressing issues with two or more data fields . . . . . **355**
Using calculations other than Sum. . . . . **356**
Using calculated data fields . . . . . **358**
Using calculated items . . . . . **359**
Calculating groups . . . . . **361**
Using Show Values As to perform other calculations. . . . . **362**
Using advanced pivot table techniques . . . . . **365**
Using AutoShow to produce executive overviews. . . . . **365**
Using ShowDetail to filter a Recordset . . . . . **367**



www.itbook.store/books/9781509307241

Creating reports for each region or model . . . . . 369
Manually filtering two or more items in a pivot field . . . . . 373
Using the conceptual filters . . . . . 374
Using the search filter . . . . . 377
Setting up slicers to filter a pivot table . . . . . 378
Using the Data Model in Excel 2019 . . . . . 381
Adding both tables to the Data Model . . . . . 381
Creating a relationship between the two tables . . . . . 382
Defining the pivot cache and building the pivot table . . . . . 383
Adding model fields to the pivot table . . . . . 383
Adding numeric fields to the Values area . . . . . 383
Putting it all together . . . . . 384
Next steps . . . . . 386

**Chapter 14 Advanced pivot table tips and techniques** 387

Tip 1: Force pivot tables to refresh automatically . . . . . 388
Tip 2: Refresh all pivot tables in a workbook at the same time . . . . . 388
Tip 3: Sort data items in a unique order, not ascending or descending . . . . . 389
Tip 4: Using (or prevent using) a custom list for sorting your pivot table . . . . . 390
Tip 5: Use pivot table defaults to change the behavior of all future pivot tables . . . . . 392
Tip 6: Turn pivot tables into hard data . . . . . 393
Tip 7: Fill the empty cells left by row fields . . . . . 393
Option 1: Implement the Repeat All Item Labels feature . . . . . 394
Option 2: Use Excel's Go To Special functionality . . . . . 395
Tip 8: Add a rank number field to a pivot table . . . . . 396
Tip 9: Reduce the size of pivot table reports . . . . . 398
Delete the source data worksheet . . . . . 398
Tip 10: Create an automatically expanding data range . . . . . 399
Tip 11: Compare tables using a pivot table . . . . . 400
Tip 12: AutoFilter a pivot table . . . . . 401
Tip 13: Force two number formats in a pivot table . . . . . 404



www.itbook.store/books/9781509307241

Tip 14: Format individual values in a pivot table ..... **405**
Tip 15: Format sections of a pivot table..... **407**
Tip 16: Create a frequency distribution with a pivot table..... **409**
Tip 17: Use a pivot table to explode a data set to different tabs ..... **410**
Tip 18: Apply restrictions on pivot tables and pivot fields..... **412**
Pivot table restrictions ..... **412**
Pivot field restrictions..... **413**
Tip 19: Use a pivot table to explode a data set to different workbooks .. **415**
Tip 20: Use percentage change from previous for year-over-year ..... **417**
Tip 21: Do a two-way VLOOKUP with Power Query ..... **419**
Next steps ..... **424**

**Chapter 15 Dr. Jekyll and Mr. GetPivotData** **425**

Avoiding the evil GetPivotData problem ..... **426**
Preventing GetPivotData by typing the formula ..... **429**
Simply turning off GetPivotData..... **429**
Speculating on why Microsoft forced GetPivotData on us..... **430**
Using GetPivotData to solve pivot table annoyances..... **431**
Building an ugly pivot table ..... **432**
Building the shell report ..... **435**
Using GetPivotData to populate the shell report..... **437**
Updating the report in future months ..... **441**
Conclusion ..... **442**

*Index*..... *443*



www.itbook.store/books/9781509307241

www.itbook.store/books/9781509307241

# Acknowledgments

Thanks to Mike Alexander for being my coauthor on the five previous editions of this book. At Microsoft, thanks to the Excel team for always being willing to answer questions about various features. At MrExcel.com, thanks to an entire community of people who are passionate about Excel. Finally, thanks to my wife, Mary Ellen, for her support during the writing process.

—Bill Jelen

Thanks to Bill Jelen for deciding to coauthor this book with me many editions ago. His knowledge of Excel still blows me away to this day. My deepest thanks to the professionals at Pearson Education for all the hours of work put into bringing this book to life. Thanks also to Bob Umlas, whose technical editing has helped us make numerous improvements to the examples and text in this book. Finally, a special thank you goes to the wife and kids for putting up with all the time I spent locked away on this project.

—Mike Alexander



www.itbook.store/books/9781509307241

www.itbook.store/books/9781509307241

# About the Authors

**Bill Jelen**, Excel MVP and the host of MrExcel.com, has been using spreadsheets since 1985, and he launched the MrExcel.com website in 1998. Bill was a regular guest on *Call for Help* with Leo Laporte and has produced more than 2,200 episodes of his daily video podcast, Learn Excel from MrExcel. He is the author of 57 books about Microsoft Excel and writes the monthly Excel column for *Strategic Finance* magazine. Before founding MrExcel.com, Bill spent 12 years in the trenches, working as a financial analyst for the finance, marketing, accounting, and operations departments of a $500 million public company. He lives in Merritt Island, Florida, with his wife, Mary Ellen.

**Mike Alexander** is a Microsoft Certified Application Developer (MCAD) and author of several books on advanced business analysis with Microsoft Access and Excel. He has more than 15 years of experience consulting and developing Office solutions. Mike has been named a Microsoft MVP for his ongoing contributions to the Excel community.



www.itbook.store/books/9781509307241

www.itbook.store/books/9781509307241

# Introduction

The pivot table is the single most powerful tool in all of Excel. Pivot tables came along during the 1990s, when Microsoft and Lotus were locked in a bitter battle for dominance of the spreadsheet market. The race to continually add enhanced features to their respective products during the mid-1990s led to many incredible features, but none as powerful as the pivot table.

With a pivot table, you can transform one million rows of transactional data into a summary report in seconds. If you can drag a mouse, you can create a pivot table. In addition to quickly summarizing and calculating data, pivot tables enable you to change your analysis on the fly by simply moving fields from one area of a report to another.

No other tool in Excel gives you the flexibility and analytical power of a pivot table.

## What you will learn from this book

It is widely agreed that close to 60 percent of Excel customers leave 80 percent of Excel untouched—that is, most people do not tap into the full potential of Excel's built-in utilities. Of these utilities, the most prolific by far is the pivot table. Despite the fact that pivot tables have been a cornerstone of Excel for almost 20 years, they remain one of the most underutilized tools in the entire Microsoft Office suite.

Having picked up this book, you are savvy enough to have heard of pivot tables—and you have perhaps even used them on occasion. You have a sense that pivot tables provide a power that you are not using, and you want to learn how to leverage that power to increase your productivity quickly.

Within the first two chapters, you will be able to create basic pivot tables, increase your productivity, and produce reports in minutes instead of hours. Within the first seven chapters, you will be able to output complex pivot reports with drill-down capabilities and accompanying charts. By the end of the book, you will be able to build a dynamic pivot table reporting system.

## What is new in Excel 2019's pivot tables

Luckily, Microsoft continues to invest heavily in business intelligence (BI), and pivot tables are the front end that let you access the new features. Some of the features added to Excel 2019 pivot tables include the following:



www.itbook.store/books/9781509307241

- You can specify default settings for all future pivot tables. If you want all pivot tables to start in Tabular layout instead of Compact layout, you can specify this. Do you prefer Classic layout or do you always replace empty cells with zero? Visit File, Options, Data, Pivot Table Defaults to change the settings for all future pivot tables.
- The automatic date grouping introduced in Excel 2016 pivot tables can now be turned off. The setting is found in File, Options, Data. The feature became unpopular after the release of Excel 2016.
- Pivot tables will be doing more summing and less counting. Previously, if you had a column with revenue and a few empty cells, the pivot table would choose to Count instead of Sum. In Excel 2019, a mix of empty cells and numeric cells will be treated like a numeric column and will default to Sum instead of Count.
- Power Pivot is now included in all Windows versions of Excel 2019 and Office 365. During the tenure of Office 2013–2016, only parts of Power Pivot were available. Although some of the Power Pivot functionality was available if you chose Add This Data To The Data Model while creating a pivot table, you can now access the Power Pivot tab in the ribbon. This allows you to create and view relationships in a diagram view. You can choose to sort one column by another column.
- With Power Pivot in Excel 2019, your pivot tables benefit from any new functions added to the DAX formula language. If you ever wanted to do Median in a pivot table or even report Text fields in the Values area, the new DAX functions such as MEDIAN and CONCATENATEX allow this to happen.
- Power View is being de-emphasized. Microsoft is replacing Power View with Power BI Desktop. You will find it difficult to locate the Power View icons in Excel 2019.
- If you are using Office 365, you will have access to the Insights command on the Insert tab. This command uses artificial intelligence to suggest 30 interesting charts or pivot tables that can be created from your data.

### Case Study: Life Before Pivot Tables

Say that your manager asks you to create a one-page summary of a sales database. He would like to see total revenue by region and product. Suppose you do not know how to use pivot tables. You will have to use dozens of keystrokes or mouse clicks to complete this task.

First, you have to build the outline of the report:

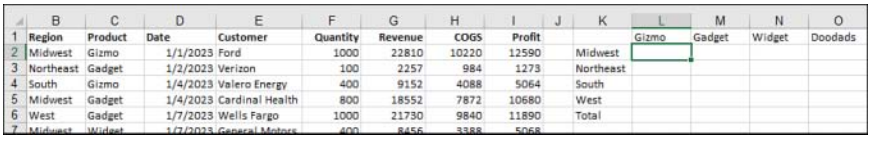
1. Copy the Product column to a blank section of the worksheet.
2. Select Data, Remove Duplicates to eliminate the duplicates.



www.itbook.store/books/9781509307241

3. Delete the Product heading.
4. Copy the unique list of products and then use Paste Special Transpose to turn the list sideways.
5. Delete the vertical list of products.
6. Copy the Region column to a blank section of the worksheet.
7. Select Data, Remove Duplicates to remove the duplicates.
8. Delete the Region heading.
9. Cut and paste the products so they appear to the left of and below the regions.

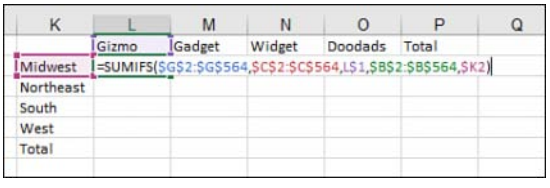
At this point, with 27 mouse clicks or keystrokes, you've built the shell of the final report, but there are no numbers inside yet (see Figure I-1).



| | B | C | D | E | F | G | H | I | J | K | L | M | N | O |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | Region | Product | Date | Customer | Quantity | Revenue | COGS | Profit | | | Gizmo | Gadget | Widget | Doodads |
| 2 | Midwest | Gizmo | 1/1/2023 | Ford | 1000 | 22810 | 10220 | 12590 | | Midwest | | | | |
| 3 | Northeast | Gadget | 1/2/2023 | Verizon | 100 | 2257 | 984 | 1273 | | Northeast | | | | |
| 4 | South | Gizmo | 1/4/2023 | Valero Energy | 400 | 9152 | 4088 | 5064 | | South | | | | |
| 5 | Midwest | Gadget | 1/4/2023 | Cardinal Health | 800 | 18552 | 7872 | 10680 | | West | | | | |
| 6 | West | Gadget | 1/7/2023 | Wells Fargo | 1000 | 21730 | 9840 | 11890 | | Total | | | | |
| 7 | Midwest | Widget | 1/7/2023 | General Motors | 400 | 8456 | 3388 | 5068 | | | | | | |

**FIGURE I-1** It took 27 clicks to get to this point.

Next, you need to build the relatively new SUMIFS function to total the revenue for the intersection of a region and product. As shown in Figure I-2, the formula =SUMIFS($G$2:$G$564,$C$2:$C$564,L$1,$B$2:$B$564,$K2) does the trick. It takes 52 characters plus the Enter key to finish the formula, but I managed to enter the formula in 36 clicks or keystrokes by using some clever navigation tricks I've learned over the years.



| | K | L | M | N | O | P | Q |
|---|---|---|---|---|---|---|---|
| | | Gizmo | Gadget | Widget | Doodads | Total | |
| | Midwest | =SUMIFS($G$2:$G$564,$C$2:$C$564,L$1,$B$2:$B$564,$K2) | | | | | |
| | Northeast | | | | | | |
| | South | | | | | | |
| | West | | | | | | |
| | Total | | | | | | |

**FIGURE I-2** If this were the year 2006, the SUMIFS function would have been an uglier SUMPRODUCT function.

If you are adept at using the Fill handle, you need just two more mouse drags to copy the formula to the rest of the table.



www.itbook.store/books/9781509307241

Enter the heading Total for the total row and for the total column. You can do this in nine keystrokes if you type the first heading, press Ctrl+Enter to stay in the same cell, and then use Copy, select the cell for the second heading, and use Paste.

If you select K1:P6 and press Alt+= (that is, Alt and the equal sign key), you can add the total formula in three keystrokes.

With this method, which takes 77 clicks or keystrokes, you end up with a nice summary report, as shown in Figure I-3. If you could pull this off in 5 or 10 minutes, you would probably be fairly proud of your Excel prowess; there are some good tricks among those 77 operations.

| K | L | M | N | O | P |
|---|---|---|---|---|---|
| | Gizmo | Gadget | Widget | Doodads | Total |
| Midwest | 652651 | 544772 | 537965 | 6036 | 1741424 |
| Northeast | 751724 | 714009 | 620019 | 38860 | 2124612 |
| South | 918588 | 839551 | 844186 | 0 | 2602325 |
| West | 70057 | 65382 | 75349 | 28663 | 239451 |
| Total | 2393020 | 2163714 | 2077519 | 73559 | 6707812 |

**FIGURE I-3** A mere 77 operations later, you have a summary report.

You hand the report to your manager. Within a few minutes, he comes back with one of the following requests, which will certainly cause a lot of rework:

- Could you put products down the side and regions across the top?
- Could you show me the same report for only the manufacturing customers?
- Could you show profit instead of revenue?
- Could you copy this report for each of the customers?

## Invention of the pivot table

When the actual pivot table was invented is in dispute. The Excel team coined the term *pivot table*, which appeared in Excel in 1993. However, the concept was not new. Pito Salas and his team at Lotus were working on the pivot table concept in 1986 and released Lotus Improv in 1991. Before then, Javelin offered functionality similar to that of pivot tables.

The core concept behind a pivot table is that the data, formulas, and data views are stored separately. Each column has a name, and you can group and rearrange the data by dragging field names to various positions on the report.



www.itbook.store/books/9781509307241

## Case Study: Life After Pivot Tables

Say that you're tired of working so hard to remake reports every time your manager wants a change. You're in luck: You can produce the same report as in the last case study but use a pivot table instead. Excel 2019 offers you 10 thumbnails of recommended pivot tables to get you close to the goal. Follow these steps:

1. Click the Insert tab of the ribbon.
2. Click Recommended PivotTables. The first recommended item is Revenue By Region (see Figure I-4).

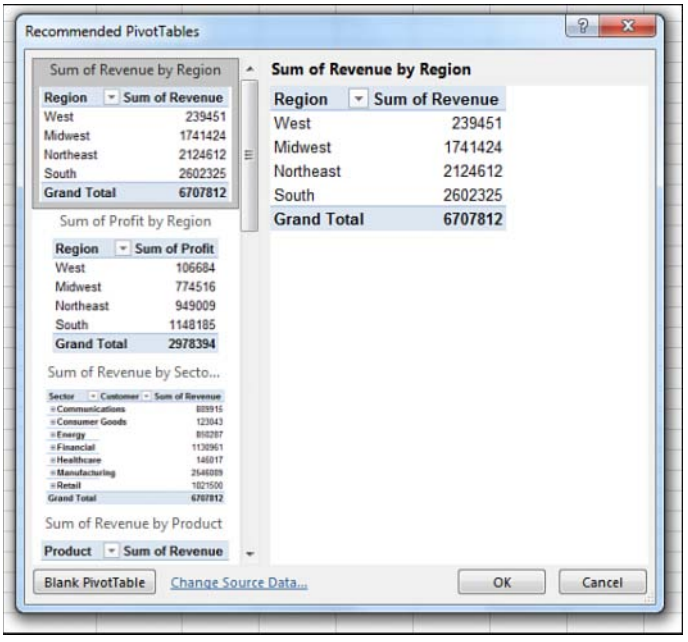



**FIGURE I-4** The first recommended pivot table is as close as you will get to the required report.

3. Click OK to accept the first pivot table.
4. Drag the Product field from the PivotTable Fields list to the Columns area (see Figure I-5).



www.itbook.store/books/9781509307241

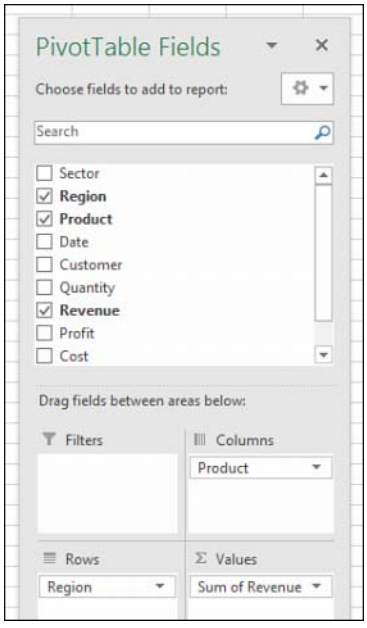



**FIGURE I-5** To finish the report, drag the Product heading to the Columns area.

5. Clear Field Headers on the right side of the ribbon.

With just five clicks of the mouse, you have the report shown in Figure I-6.

| Sum of Revenue | Product | | | | |
|---|---|---|---|---|---|
| Region | Doodads | Gadget | Gizmo | Widget | Grand Total |
| West | 28663 | 65382 | 70057 | 75349 | 239451 |
| Midwest | 6036 | 544772 | 652651 | 537965 | 1741424 |
| Northeast | 38860 | 714009 | 751724 | 620019 | 2124612 |
| South | 0 | 839551 | 918588 | 844186 | 2602325 |
| **Grand Total** | **73559** | **2163714** | **2393020** | **2077519** | **6707812** |

**FIGURE I-6** It took five clicks to create this report.

In addition, when your manager comes back with a request like the ones near the end of the prior case study, you can easily use the pivot table to make the changes. Here's a quick overview of the changes you'll learn to make in the chapters that follow:

- Could you put products down the side and regions across the top? (This change will take you 10 seconds: Drag Product to Rows and Region to Columns.)
- Could you show me the same report for only the manufacturing customers? (15 seconds: Select Insert Slicer, Sector; click OK; click Manufacturing.)



www.itbook.store/books/9781509307241

- Could you show profit instead of revenue? (10 seconds: Clear the check box for Revenue, select the check box for Profit.)
- Could you copy this report for each of the customers? (30 seconds: Move Customer to Report Filter, open the tiny drop-down menu next to the Options button, choose Show Report Filter Pages, click OK.)

## Excel 2019 versus Office 365

The title of this book says Excel 2019. In reality, no one should be buying Office 2019. Instead, it is likely that you are renting Office 365. As of May 2018, Office 2019 and Office 365 were nearly equivalent.

Here's why the authors hope that you did not purchase Office 2019: The features in Office 2019 will not change. The features in Office 365 will constantly evolve and improve. The people who have been using Office 365 have enjoyed the new features described earlier in this chapter one to two years before the people who purchased Office 2019.

Because the title of this book says Excel 2019, the screenshots show the Excel 2019 ribbon. However, anyone using Office 365 will have a new look to the ribbon.

Microsoft reduced the number of colors in the Office 365 ribbon. The selected Ribbon tab is now underlined instead of being a different color. Compare the Excel 2019 Insert tab in Figure I-7 with the Office 365 Insert tab in Figure I-8.

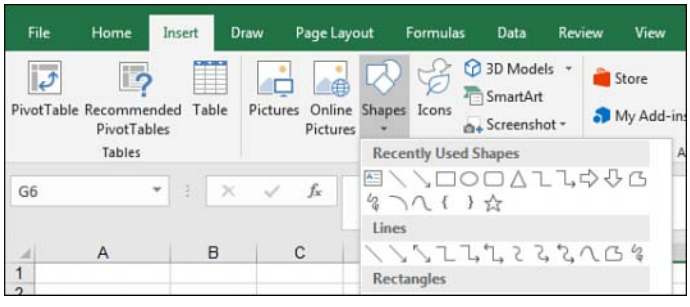



**FIGURE I-7** The Excel 2019 ribbon is very similar to the Excel 2016 ribbon.



www.itbook.store/books/9781509307241

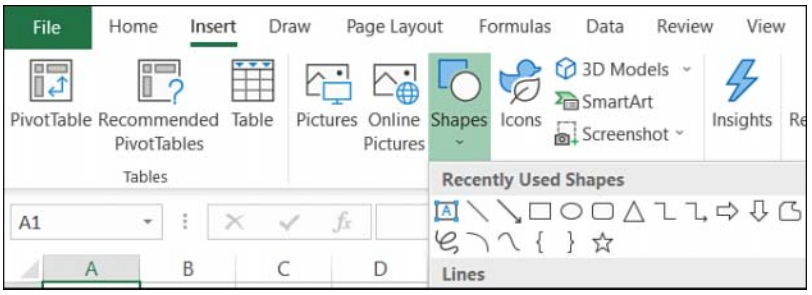



**FIGURE I-8** The Office 365 ribbon introduced in the summer of 2018 uses a new font and fewer colors.

Microsoft is experimenting with a new ribbon that goes back to a single row like the Office 2013 menus. As of the summer of 2018, that new ribbon will debut with Outlook and Excel Online and only for Office 365 customers. It remains to be seen if that ribbon ever makes it to the desktop version of Excel.

## New features in Office 365

After this book is printed, the Excel team will release new features for Excel. Anyone with an Office 365 subscription will receive the new features. People with Excel 2019 will not get the new features.

For any new features introduced to Office 365, the owners of Excel 2019 will have to purchase Office 2022 in order to access those features.

But what is even worse, some features introduced will be marked as Office 365 Exclusive features. Those features will never be available to customers who buy the perpetual versions of Office, such as Office 2016, Office 2019, or Office 2022.

One such feature introduced in early 2018 is the Insights feature. This feature will send up to 250,000 cells of your data to a Microsoft server where artificial intelligence looks for trends in your data. The first few results from Insights are very similar to the Insert Recommended PivotTable logic introduced in Excel 2013 and shown previously in Figure I-4.

However, if you click the More link, Insights often provides two to three dozen suggestions. Most suggestions will insert a pivot table and a pivot chart. In the first preview of Insights, Excel will look for: rank, evenness, trend, composite signal, attribution, outstanding top two, monotonicity (always increasing or always decreasing), and unimodality (having a single peak data point).

When I used the data set from this Introduction with Insights in Office 365, Microsoft suggested 32 different possible results. One is shown in Figure I-9.



www.itbook.store/books/9781509307241

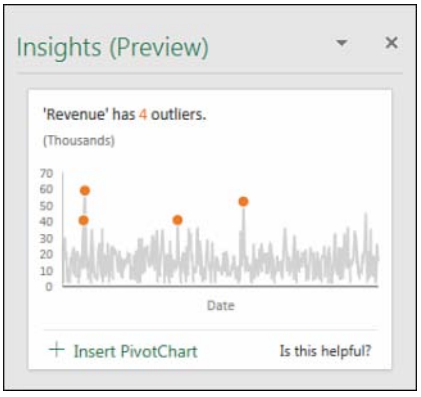



**FIGURE I-9** Excel used artificial intelligence to spot these outliers.

If you regularly purchased every new version of Office, it will cost less to rent Office 365 at $10 a month than to pay $399 for the perpetual version of Office every 36 months. Office 365 offers more features than Excel 2019. Unless your buying pattern is to only buy every second or third version of Office, upgrading to Office 365 makes sense.

## Who this book is for

This book is a comprehensive-enough reference for hard-core analysts yet relevant to casual users of Excel.

We assume that you are comfortable navigating in Excel and that you have some large data sets that you need to summarize.

## How this book is organized

The bulk of the book covers how to use pivot tables in the Excel user interface. Chapter 10, "Unlocking features with the Data Model and Power Pivot," delves into the Power Pivot window. Chapter 13, "Using VBA to create pivot tables," describes how to create pivot tables in Excel's powerful VBA macro language. Anyone who has a firm grasp of basics such as preparing data, copying, pasting, and entering simple formulas should not have a problem understanding the concepts in this book.



www.itbook.store/books/9781509307241

CHAPTER 4

# Grouping, sorting, and filtering pivot data

**In this chapter, you will:**

- Use the PivotTable Fields list
- Sort in a pivot table
- Filter a pivot table: an overview
- Use filters for row and column fields
- Filter using the Filters area
- Group and create hierarchies in a pivot table

With Excel 2019, Microsoft has reversed the auto date grouping added to Excel 2016. Removing the feature was a good move, as the feature proved hard to predict. For anyone who loved the auto grouping and the Drill-Down and Drill-Up features, you can re-create them, although it requires a few extra steps. Grouping will be covered last in this chapter.

First, a quick overview of the PivotTable Fields. Then, a detailed look at sorting, filtering, and grouping a pivot table.

## Using the PivotTable Fields list

The entry points for sorting and filtering are spread throughout the Excel interface. It is worth taking a closer look at the row header drop-downs and the PivotTable Fields list before diving in to sorting and filtering.

As you've seen in these pages, I rarely use the Compact form for a pivot table. I use Pivot Table Defaults to make sure my pivot tables start in Tabular layout instead of Compact layout. Although there are many good reasons for this, one is illustrated in Figures 4-1 and 4-2.



www.itbook.store/books/9781509307241

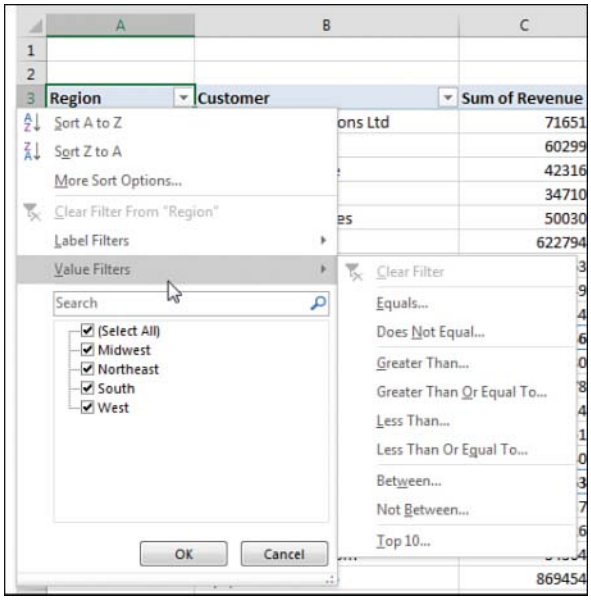



**FIGURE 4-1** The drop-down menu in B3 for Customer is separate from the drop-down menu for Region.

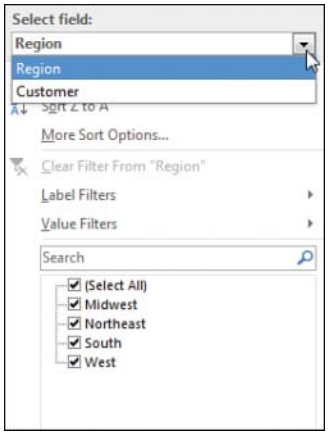



**FIGURE 4-2** In Compact form, one single drop-down menu tries to control sorting and filtering for all the row fields.

In Figure 4-1, a Region drop-down menu appears in A3. A Customer drop-down menu appears in B3. Each of these separate drop-downs offers great settings for sorting and filtering.

When you leave the pivot table in the Compact form, there are not separate headings for Region and Customer. Both fields are crammed into column A, with the silly heading Row Labels. This means the drop-down menu always offers sorting and filtering options for Region. Every time you go back to the A3 drop-down menu with hopes of filtering or sorting the Customer field, you have to reselect Customer from a drop-down at the top of the menu. This is an extra click. If you are making five changes



www.itbook.store/books/9781509307241

to the Customer field, you are reselecting Customer over and over and over and over and over. This should be enough to convince you to abandon the Compact layout.

If you decide to keep the Compact layout and get frustrated with the consolidated Row Labels drop-down menu, you can directly access the invisible drop-down menu for the correct field by using the PivotTable Fields list, which contains a visible drop-down menu for every field in the areas at the bottom. Those visible drop-down menus do not contain the sorting and filtering options.

The good drop-down menus are actually in the top of the Fields list, but you have to hover over the field to see the drop-down menu appear. After you hover as shown in Figure 4-3, you can directly access the same customer drop-down menu shown in Figure 4-1.

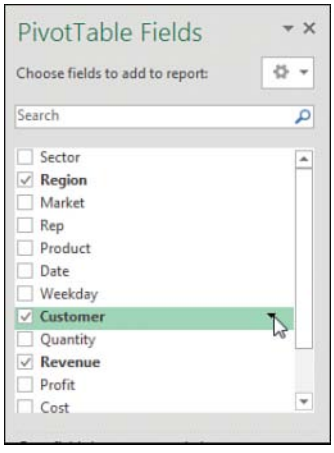



**FIGURE 4-3** Hover over the field in the top of the Fields list to directly access the sorting and filtering settings for that field.

## Docking and undocking the PivotTable Fields list

The PivotTable Fields list starts out docked on the right side of the Excel window. Hover over the green PivotTable Fields heading in the pane, and the mouse pointer changes to a four-headed arrow. Drag to the left to enable the pane to float anywhere in your Excel window.

After you have undocked the PivotTable Fields list, you might find that it is difficult to redock it on either side of the screen. To redock the Fields list, you must grab the title bar and drag until at least 85% of the Fields list is off the edge of the window. Pretend that you are trying to remove the floating Fields list completely from the screen. Eventually, Excel gets the hint and redocks it. Note that you can dock the PivotTable Fields list on either the right side or the left side of the screen.

## Rearranging the PivotTable Fields list

As shown in Figure 4-4, a small gear-wheel icon appears near the top of the PivotTable Fields list. Select this drop-down menu to see its five possible arrangements. Although the default is to have the Fields section at the top of the list and the Areas section at the bottom of the list, four other arrangements are



www.itbook.store/books/9781509307241

possible. Other options let you control whether the fields in the list appear alphabetically or in the same sequence that they appeared in the original data set.

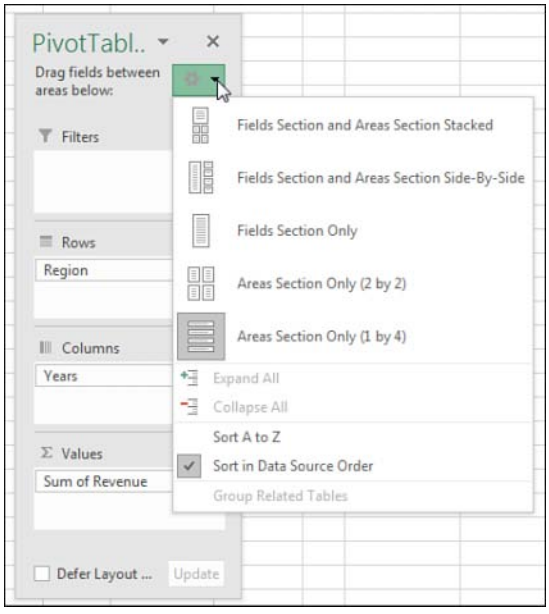



**FIGURE 4-4** Use this drop-down menu to rearrange the PivotTable Fields list.

The final three arrangements offered in the drop-down menu are rather confusing. If someone changes the PivotTable Fields list to show only the Areas section, you cannot see new fields to add to the pivot table.

If you ever encounter a version of the PivotTable Fields list with only the Areas section (see Figure 4-4) or only the Fields section, remember that you can return to a less-confusing view of the data by using the arrangement drop-down menu.

## Using the Areas section drop-downs

As shown in Figure 4-5, every field in the Areas section has a visible drop-down arrow. When you select this drop-down arrow, you see four categories of choices:

- The first four choices enable you to rearrange the field within the list of fields in that area of the pivot table. You can accomplish this by dragging the field up or down in the area.
- The next four choices enable you to move the field to a new area. You could also accomplish this by dragging the field to a new area.
- The next choice enables you to remove the field from the pivot table. You can also accomplish this by dragging the field outside the Fields list.
- The final choice displays the Field Settings dialog box for the field.



www.itbook.store/books/9781509307241

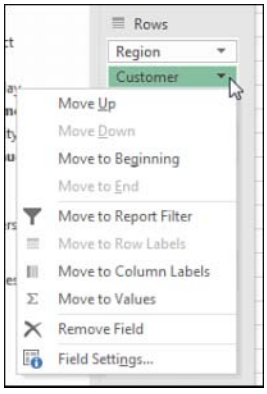



**FIGURE 4-5** Use this drop-down menu to rearrange the fields in your pivot table.

## Sorting in a pivot table

Items in the row area and column area of a pivot table are sorted in ascending order by any custom list first. This allows weekday and month names to sort into Monday, Tuesday, Wednesday, ... instead of the alphabetical order Friday, Monday, Saturday, ..., Wednesday.

If the items do not appear in a custom list, they will be sorted in ascending order. This is fine, but in many situations, you want the customer with the largest revenue to appear at the top of the list. When you sort in descending order using a pivot table, you are setting up a rule that controls how that field is sorted, even after new fields are added to the pivot table.

**Tip** Excel 2019 includes four custom lists by default, but you can add your own custom list to control the sort order of future pivot tables. See the section "Using a custom list for sorting," later in this chapter.

### Sorting customers into high-to-low sequence based on revenue

Three pivot tables appear in Figure 4-6. The first pivot table shows the default sort for a pivot table: Customers are arranged alphabetically, starting with Adaept, Calleia, and so on.

In the second pivot table, the report is sorted in descending sequence by Total Revenue. This pivot table was sorted by selecting cell E3 and choosing the ZA icon in the Data tab of the ribbon. Although that sounds like a regular sort, it is better. When you sort inside a pivot table, Excel sets up a rule that will be used after you make additional changes to the pivot table.



www.itbook.store/books/9781509307241

| | A | B | C | D | E | F | G | H |
|---|---|---|---|---|---|---|---|---|
| 1 | Customers AZ is default | | | Sort descending by revenue | | | After adding fields, sort rule remains | |
| 2 | | | | | | | | |
| 3 | Customer | Total $ | | Customer | Total $ | | | Total $ |
| 4 | Adaept Information Mana | 498937 | | MySpreadsheetLab | 869454 | | Consulting | 2555333 |
| 5 | Calleia Company | 406326 | | Surten Excel | 750163 | | Surten Excel | 750163 |
| 6 | Excel Design Solutions Ltd | 71651 | | SkyWire, Inc. | 704359 | | NetCom Computer | 613514 |
| 7 | Excel Learning Zone | 72680 | | SpringBoard | 622794 | | Adaept Information M | 498937 |
| 8 | Excel4Apps | 91320 | | NetCom Computer | 613514 | | Calleia Company | 406326 |
| 9 | Excel-Translator.de | 42316 | | St. Peter's Prep | 568851 | | Excel Design Solution | 71651 |
| 10 | F-Keys Ltd. | 34710 | | Adaept Information Mana | 498937 | | Yesenita | 62744 |
| 11 | JEVS Human Services | 50030 | | The Salem Ohio Historical | 427349 | | Symons | 55251 |
| 12 | LearnExcelBooks.com | 34364 | | Calleia Company | 406326 | | JEVS Human Services | 50030 |
| 13 | MyExcelOnline.com | 54048 | | MyOnlineTrainingHub.cor | 390978 | | Spain Enterprises | 46717 |
| 14 | MyOnlineTrainingHub.cor | 390978 | | Excel4Apps | 91320 | | Museums | 427349 |
| 15 | MySpreadsheetLab | 869454 | | Excel Learning Zone | 72680 | | The Salem Ohio Histo | 427349 |

**FIGURE 4-6** When you override the default sort, Excel remembers the sort as additional fields are added.

The pivot table in columns G:H shows what happens after you add Sector as a new outer row field. Within each sector, the pivot table continues to sort the data in descending order by revenue. Within Consulting, Surten Excel appears first, with $750K, followed by NetCom, with $614K.

You could remove Customer from the pivot table, do more adjustments, and then add Customer back to the column area, and Excel would remember that the customers should be presented from high to low.

If you could see the entire pivot table in G3:H35 in Figure 4-6, you would notice that the sectors are sorted alphabetically. It might make more sense, though, to put the largest sectors at the top. The following tricks can be used for sorting an outer row field by revenue:

- You can select cell G4 and then use Collapse Field on the Analyze tab to hide the customer detail. When you have only the sectors showing, select H4 and click ZA to sort descending. Excel understands that you want to set up a sort rule for the Sector field.
- You can temporarily remove Customer from the pivot table, sort descending by revenue, and then add Customer back.
- You can use More Sort Options, as described in the following paragraphs.

To sort the Sector field, you should open the drop-down menu for the Sector field. Hover over Sector in the top of the PivotTable Fields list, and click the drop-down arrow that appears (see Figure 4-7). Or, if your pivot table is shown in Tabular layout or Outline layout, you can simply open the drop-down arrow in cell G3.

Inside the drop-down menu, choose More Sort Options to open the Sort (Sector) dialog box. In this dialog box, you can choose to sort the Sector field in Descending order by Total $ (see Figure 4-8).



www.itbook.store/books/9781509307241

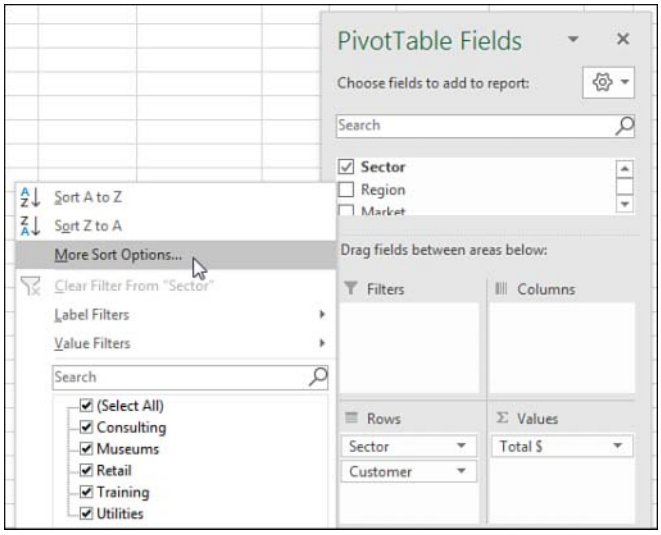



**FIGURE 4-7** For explicit control over sort order, open this drop-down menu.

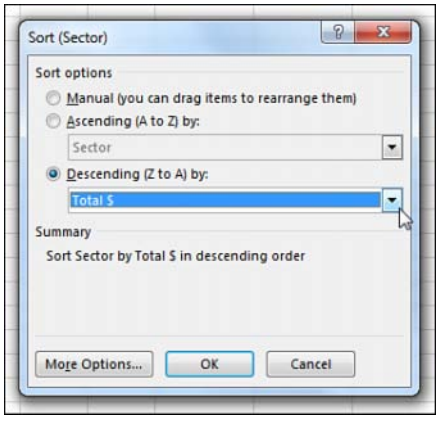



**FIGURE 4-8** Choose to sort Sector based on the Total $ field.

The Sort (Sector) dialog box shown in Figure 4-8 includes a More Options button in the lower left. If you click this button, you arrive at the More Sort Options dialog box, in which you can specify a custom list to be used for the first key sort order. You can also specify that the sorting should be based on a column other than Grand Total.

In Figure 4-10, the pivot table includes Product in the column area. If you wanted to sort the customers based on total gadget revenue instead of total revenue, for example, you could do so with the More Sort Options dialog box. Here are the steps:

1. Open the Customer heading drop-down menu in B4.
2. Choose More Sort Options.



www.itbook.store/books/9781509307241

3. In the Sort (Customer) dialog box, choose More Options.
4. In the More Sort Options (Customer) dialog box, choose the Sort By Values In Selected Column option (see Figure 4-9).
5. Click in the reference box and then click cell D5. Note that you cannot click the Gadget heading in D4; you have to choose one of the Gadget value cells.
6. Click OK twice to return to the pivot table.

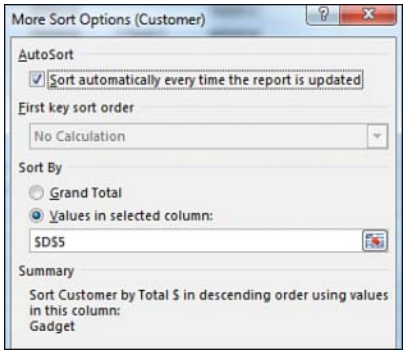



**FIGURE 4-9** Using More Sort Options, you can sort by a specific pivot field item.

If your pivot table has only one field in the Rows area, you can set up the "Sort by Doodads" rule by doing a simple sort using the Data tab. Select any cell in B5:B30 and choose Data, ZA. The pivot table will be sorted with the largest Doodads customers at the top (see Figure 4-10). Note that you cannot sort from the Doodads heading in B4. Sorting from there will sort the product columns by revenue.

| | A | B | C | D | E |
|---|---|---|---|---|---|
| 3 | Total $ | Product | | | |
| 4 | Customer | Doodads | Gadget | Gizmo | Widget |
| 5 | Excel Learning Zone | 38860 | 22140 | 11680 | 0 |
| 6 | Excel4Apps | 28663 | 20115 | 30068 | 12474 |
| 7 | Excel-Translator.de | 6036 | 18552 | 17728 | 0 |
| 8 | JEVS Human Services | 0 | 30104 | 4614 | 15312 |
| 9 | MySpreadsheetLab | 0 | 304198 | 288409 | 276847 |
| 10 | Adaept Information Management | 0 | 182755 | 173770 | 142412 |

**FIGURE 4-10** Sort from cell E5 to sort by Doodads.

## Using a manual sort sequence

The Sort dialog box offers something called a *manual sort*. Rather than using the dialog box, you can invoke a manual sort in a surprising way.

Note that the products in Figure 4-10 are in the following order: Doodads, Gadget, Gizmo, and Widget. It appears that the Doodads product line is a minor product line and probably would not fall first in the product list.



www.itbook.store/books/9781509307241

Place the cell pointer in cell E4 and type the word **Doodads**. When you press Enter, Excel figures out that you want to move the Doodads column to be last. All the values for this product line move from column B to column E. The values for the remaining products shift to the left.

One unintended consequence is that the customers re-sort based on the product that moved to column B: Gadget. This is because the "Sort by Doodads" rule was actually a "Sort by whatever is in column B" rule.

In Figure 4-11, note the numbers in row 17 and compare them to the numbers in row 5 in Figure 4-10. The values followed the change in headings.

This behavior is completely unintuitive. You should never try this behavior with a regular (non–pivot table) data set in Excel. You would never expect Excel to change the data sequence just by moving the labels. Figure 4-11 shows the pivot table after a new column heading has been typed in cell E4.

| | A | B | C | D | E | F |
|---|---|---|---|---|---|---|
| 3 | Total $ | Product | | | | |
| 4 | Customer | Gadget | Gizmo | Widget | Doodads | Grand Total |
| 5 | St. Peter's Prep | 367915 | 200936 | 0 | 0 | 568851 |
| 6 | MySpreadsheetLab | 304198 | 288409 | 276847 | 0 | 869454 |
| 7 | Surten Excel | 233435 | 235761 | 280967 | 0 | 750163 |
| 8 | NetCom Computer | 204234 | 205758 | 203522 | 0 | 613514 |
| 9 | SpringBoard | 185675 | 245491 | 191628 | 0 | 622794 |
| 10 | SkyWire, Inc. | 185286 | 224935 | 294138 | 0 | 704359 |
| 11 | Adaept Information Management | 182755 | 173770 | 142412 | 0 | 498937 |
| 12 | The Salem Ohio Historical Society | 178254 | 149551 | 99544 | 0 | 427349 |
| 13 | Calleia Company | 133009 | 159354 | 113963 | 0 | 406326 |
| 14 | MyOnlineTrainingHub.com | 100784 | 165727 | 124467 | 0 | 390978 |
| 15 | JEVS Human Services | 30104 | 4614 | 15312 | 0 | 50030 |
| 16 | Vertex42 | 26484 | 19544 | 13853 | 0 | 59881 |
| 17 | Excel Learning Zone | 22140 | 11680 | 0 | 38860 | 72680 |
| 18 | Excel Design Solutions Ltd | 20950 | 41066 | 9635 | 0 | 71651 |
| 19 | MyExcelOnline.com | 20610 | 7032 | 26406 | 0 | 54048 |
| 20 | Excel4Apps | 20115 | 30068 | 12474 | 28663 | 91320 |
| 21 | Spain Enterprises | 19520 | 25378 | 1819 | 0 | 46717 |

**FIGURE 4-11** Simply type a heading in E4 to rearrange the columns.

If you prefer to use the mouse, you can drag and drop the column heading to a new location. Select a column heading. Hover over the edge of the active cell border until the mouse changes to a four-headed arrow. Drag the cell to a new location, as shown in Figure 4-12. When you release the mouse, all the value settings move to the new column.

| | A | B | C | D | E | F |
|---|---|---|---|---|---|---|
| 3 | Total $ | Product | | | D4:D31 | |
| 4 | Customer | Gadget | Gizmo | Widget | Doodads | Grand Total |
| 5 | St. Peter's Prep | 367915 | 200936 | 0 | 0 | 568851 |
| 6 | MySpreadsheetLab | 304198 | 288409 | 276847 | 0 | 869454 |
| 7 | Surten Excel | 233435 | 235761 | 280967 | 0 | 750163 |
| 8 | NetCom Computer | 204234 | 205758 | 203522 | 0 | 613514 |
| 9 | SpringBoard | 185675 | 245491 | 191628 | 0 | 622794 |
| 10 | SkyWire, Inc. | 185286 | 224935 | 294138 | 0 | 704359 |

**FIGURE 4-12** Use drag and drop to move a column to a new position.



www.itbook.store/books/9781509307241

**Caution** After you use a manual sort, any new products you add to the data source are automatically added to the end of the list rather than appearing alphabetically.

## Using a custom list for sorting

Another way to permanently change the order of items along a dimension is to set up a custom list. All future pivot tables created on your computer will automatically respect the order of the items in a custom list.

The pivot table at the top of Figure 4-13 includes weekday names. The weekday names were added to the original data set by using `=TEXT(F2,"DDD")` and copying down. Excel automatically puts Sunday first and Saturday last, even though this is not the alphabetical sequence of these words. This happens because Excel ships with four custom lists to control the days of the week, months of the year, and the three-letter abbreviations for both.

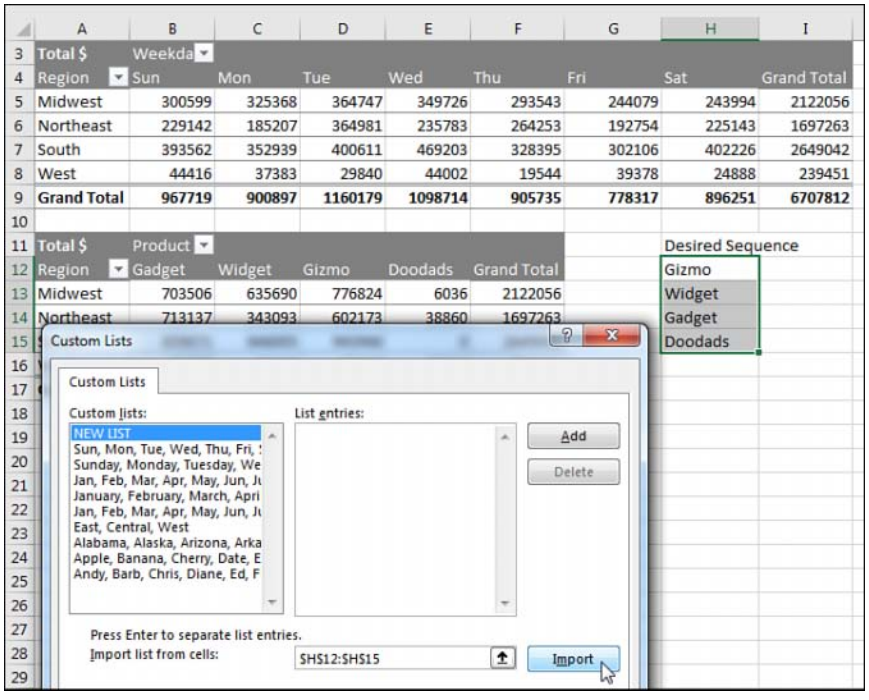



**FIGURE 4-13** The weekday names in B4:H4 follow the order specified in the Custom Lists dialog box.



www.itbook.store/books/9781509307241

You can define your own custom list to control the sort order of pivot tables. Follow these steps to set up a custom list:

1. In an out-of-the-way section of the worksheet, type the products in their proper sequence. Type one product per cell, going down a column.
2. Select the cells containing the list of regions in the proper sequence.
3. Click the File tab and select Options.
4. Select the Advanced category in the left navigation bar. Scroll down to the General group and click the Edit Custom Lists button. In the Custom Lists dialog box, your selection address is entered in the Import text box, as shown in Figure 4-13.
5. Click Import to bring the products in as a new list.
6. Click OK to close the Custom Lists dialog box, and then click OK to close the Excel Options dialog box.

The custom list is now stored on your computer and is available for all future Excel sessions. All future pivot tables will automatically show the product field in the order specified in the custom list. Figure 4-14 shows a new pivot table created after the custom list was set up.

| | A | B | C | D | E | F |
|---|---|---|---|---|---|---|
| 3 | Sum of Profit | Product | | | | |
| 4 | Market | Gizmo | Widget | Gadget | Doodads | Grand Total |
| 5 | New York | 273896 | 150766 | 318020 | 16996 | 759678 |
| 6 | Arkla | 124684 | 123662 | 133824 | 0 | 382170 |
| 7 | Atlanta | 81760 | 64372 | 87576 | 0 | 233708 |
| 8 | Charlotte | 71540 | 49973 | 57072 | 0 | 178585 |

**FIGURE 4-14** After you define a custom list, all future pivot tables will follow the order in the list.

To sort an existing pivot table by the newly defined custom list, follow these steps:

1. Open the Product header drop-down menu and choose More Sort Options.
2. In the Sort (Product) dialog box, choose More Options.
3. In the More Sort Options (Product) dialog box, clear the AutoSort check box.
4. As shown in Figure 4-15, in the More Sort Options (Product) dialog box, open the First Key Sort Order drop-down menu and select the custom list with your product names.
5. Click OK twice.



www.itbook.store/books/9781509307241

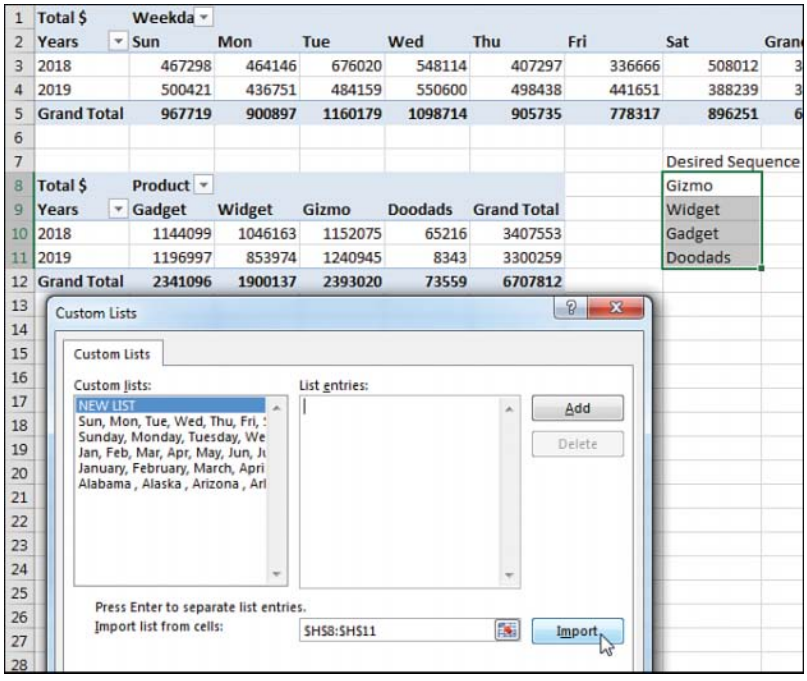



**FIGURE 4-15** Choose to sort by the custom list.

**Caution** Items in a custom list will automatically sort to the top of all future pivot tables. If you have a pivot table of people using their first names, people with names like Jan, May, and April will automatically appear before other names. Names that appear in any list, even across several custom lists will sort in the wrong sequence. To turn off this behavior for one pivot table: right-click one cell in the pivot table and choose PivotTable options. On the Totals & Filters tab, unselect Use Custom Lists When Sorting. If you want to turn this off for all pivot tables, change the Pivot Table Defaults using File, Options, Data, Edit Default Layout, PivotTable Options.

## Filtering a pivot table: an overview

Excel 2019 provides dozens of ways to filter a pivot table. Figure 4-16 shows some of the filters available. These methods, and the best way to use each one, are discussed in the following sections.



www.itbook.store/books/9781509307241

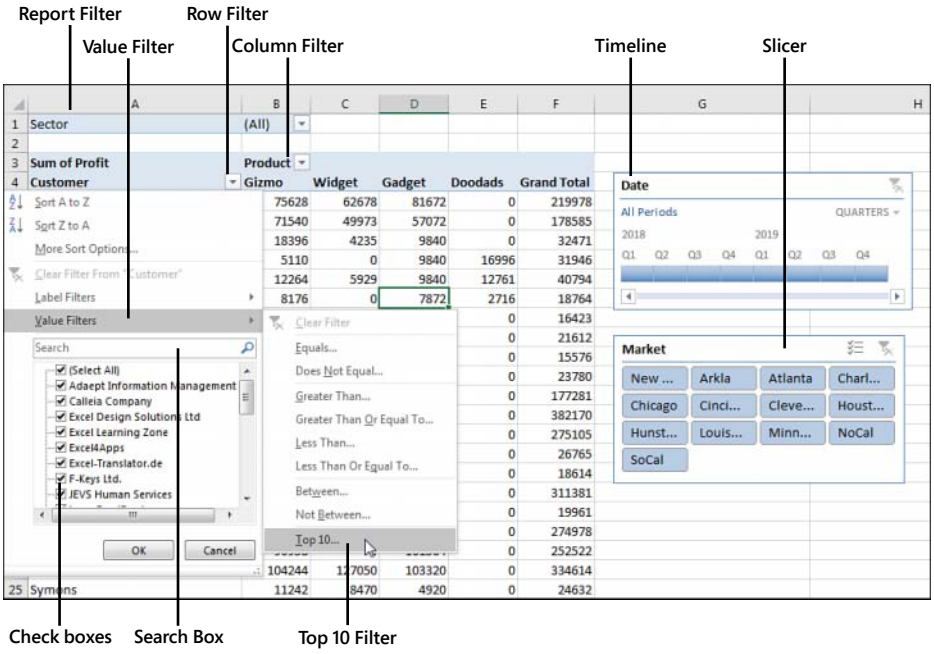



**FIGURE 4-16** This figure shows a fraction of the available filtering choices.

There are four ways to filter a pivot table, as shown in Figure 4-16:

- The Date Timeline filter in G4:H10 was introduced in Excel 2013.
- The Market filter in G12:H19 is an example of the slicer introduced in Excel 2010.
- A drop-down menu in B1 offers what were known as page filters in Excel 2003, report filters in Excel 2010, and now simply filters.
- Cell G4 offers the top-secret AutoFilter location.
- Drop-down menus in A4 and B3 lead to even more filters.
- You see the traditional check box filters for each pivot item.
- A Search box filter was introduced in Excel 2010.
- A flyout menu has Label filters.
- Depending on the field type, you might see a Value Filters flyout menu, including the powerful Top 10 filter, which can do Top 10, Bottom 5, Bottom 3%, Top $8 Million, and more.
- Depending on the field type, you might see a Date Filters flyout menu, with 37 virtual filters such as Next Month, Last Year, and Year to Date.



www.itbook.store/books/9781509307241

# Using filters for row and column fields

If you have a field (or fields) in the row or column area of a pivot table, a drop-down menu with filtering choices appears on the header cell for that field. In Figure 4-16, a Customer drop-down menu appears in A4, and a Product drop-down menu appears in B3. The pivot table in that figure is using Tabular layout. If your pivot tables use Compact layout, you see a drop-down menu on the cell with Row Labels or Column Labels.

If you have multiple row fields, it is just as easy to sort using the invisible drop-down menus that appear when you hover over a field in the top of the PivotTable Fields list.

## Filtering using the check boxes

You might have a few annoying products appear in a pivot table. In the present example, the Doodads product line is a specialty product with very little sales. It might be an old legacy product that is out of line, but it still gets an occasional order from the scrap bin. Every company seems to have these orphan sales that no one really wants to see.

The check box filter provides an easy way to hide these items. Open the Product drop-down menu and clear the Doodads check box. The product is hidden from view (see Figure 4-17) .

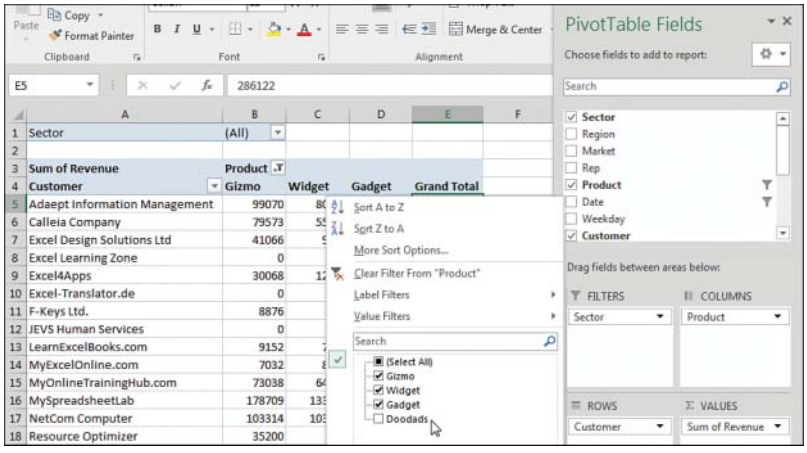



**FIGURE 4-17** Open the Product filter and clear the Doodads check box.

What if you need to clear hundreds of items' check boxes in order to leave only a few items selected? You can toggle all items off or on by using the Select All check box at the top of the list. You can then select the few items that you want to show in the pivot table.

In Figure 4-18, Select All turned off all customers and then two clicks reselected Excel4Apps and F-Keys Ltd.



www.itbook.store/books/9781509307241

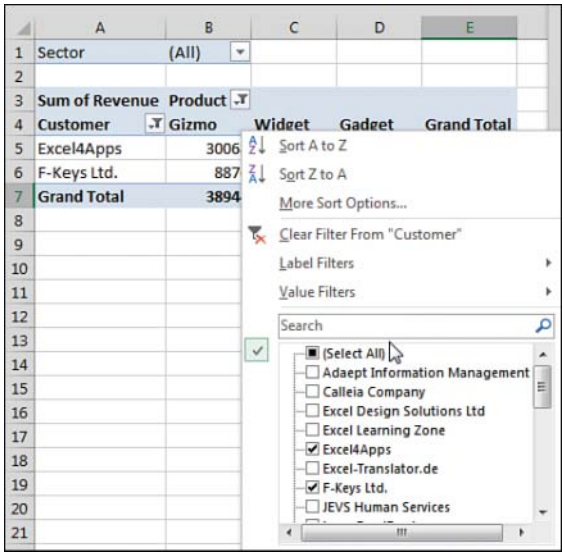



**FIGURE 4-18** Use Select All to toggle all items off or on.

The check boxes work great in this tiny data set with 26 customers. In real life, with 500 customers in the list, it will not be this easy to filter your data set by using the check boxes.

## Filtering using the search box

When you have hundreds of customers, the search box can be a great timesaver. In Figure 4-19, the database includes consultants, trainers, and other companies. If you want to narrow the list to companies with *Excel* or *spreadsheet* in their name, you can follow these steps:

1. Open the Customer drop-down menu.
2. Type **Excel** in the search box (see Figure 4-19).

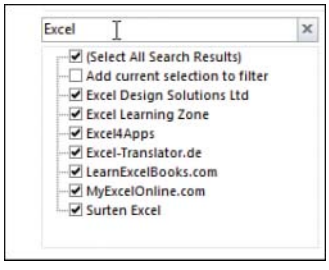



**FIGURE 4-19** Select the results of the first search.

3. By default, Select All Search Results is selected. Click OK.
4. Open the Customer drop-down menu again.
5. Type **spreadsheet** in the search box.



www.itbook.store/books/9781509307241

6. Choose Add Current Selection to Filter, as shown in Figure 4-20. Click OK.

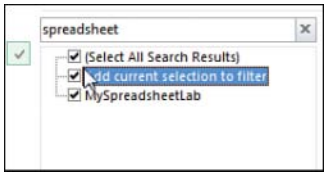



**FIGURE 4-20** For the second search, add these results to the existing filter.

You now have all customers with either *Excel* or *spreadsheet* in the name.

**Caution** Filters applied with the search box are single-use filters. If you add more data to the underlying data and refresh the pivot table, this filter will not be reevaluated.

If you need to reapply the filter, it would be better to use the Label filters as discussed in the following section. Label filters would work to find every customer with Excel in the name. It would not work to find "Excel or spreadsheet."

## Filtering using the Label Filters option

The search box isn't perfect. What if you want to find all the Lotus 1-2-3 consultants and turn those off? There is no Select Everything Except These Results choice. Nor is there a Toggle All Filter Choices choice. However, the Label Filters option enables you to handle queries such as "select all customers that do not contain 'Lotus.'"

Text fields offer a flyout menu called Label Filters. To filter out all of the Insurance customers, you can apply a Does Not Contain filter (see Figure 4-21). In the next dialog box, you can specify that you want customers that do not contain Excel, Exc, or Exc* (see Figure 4-22).

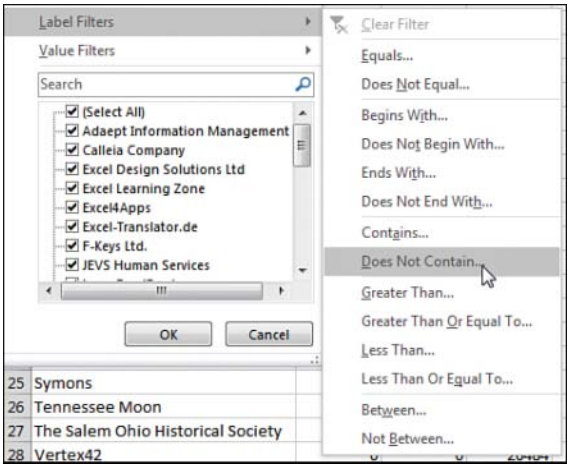



**FIGURE 4-21** Choose Label Filters, Does Not Contain.



www.itbook.store/books/9781509307241

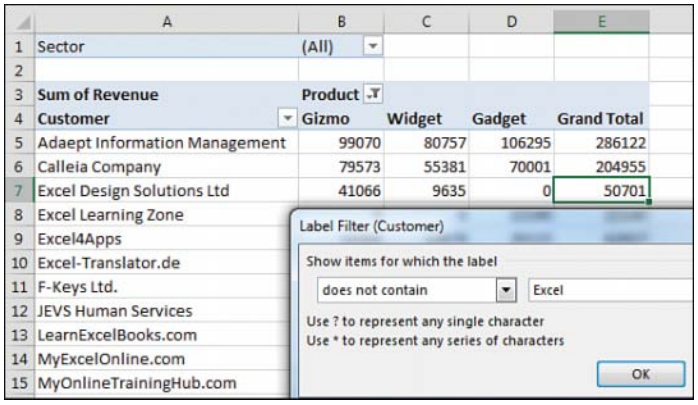



**FIGURE 4-22** Specify to exclude customers containing Excel.

Note that label filters are not additive. You can only apply one label filter at a time. If you take the data in Figure 4-21 and apply a new label filter of between D and Fzzz, some Excel customers that were filtered out in Figure 4-22 come back, as shown in Figure 4-23.

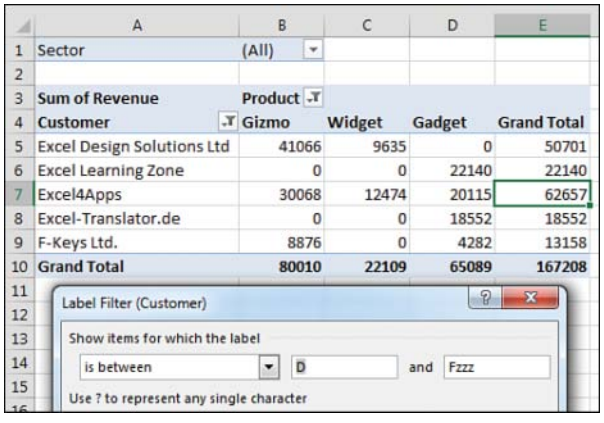



**FIGURE 4-23** Note that a second label filter does not get added to the previous filter. Excel is back in.

## Filtering a Label column using information in a Values column

The Value Filters flyout menu enables you to filter customers based on information in the Values columns. Perhaps you want to see customers who had between $20,000 and $30,000 of revenue. You can use the Customer heading drop-down menu to control this. Here's how:

1. Open the Customer drop-down menu.
2. Choose Label Filters.
3. Choose Between (see Figure 4-24).
4. Type the values **20000** and **30000**, as shown in Figure 4-25.



www.itbook.store/books/9781509307241

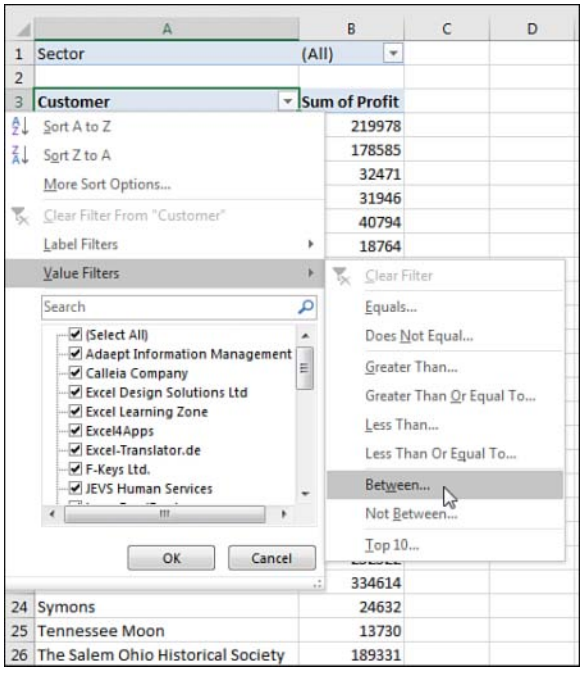



**FIGURE 4-24** Value Filters for the Customer column will look at values in the Revenue field.

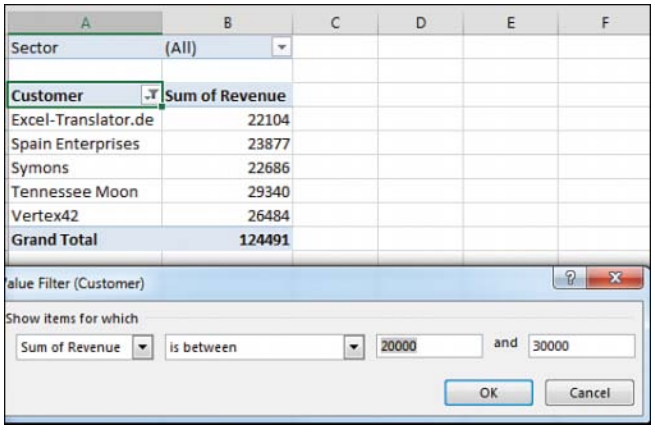



**FIGURE 4-25** Choose customers between 20000 and 30000, inclusive.

5. Click OK.

The results are inclusive; if a customer had exactly $20,000 or exactly $30,000, they are returned along with the customers between $20,000 and $30,000.

**Note** Choosing a Value filter clears out any previous Label filters.



www.itbook.store/books/9781509307241

## Creating a top-five report using the Top 10 filter

One of the more interesting value filters is the Top 10 filter. If you are sending a report to the VP of Sales, she is not going to want to see hundreds of pages of customers. One short summary with the top customers is almost more than her attention span can handle. Here's how to create it:

1. Go to the Customer drop-down menu and choose Value Filters, Top 10.
2. In the Top 10 Filter dialog box, which enables you to choose Top or Bottom, leave the setting at the default of Top.
3. In the second field, enter any number of customers: 10, 5, 7, 12, or something else.
4. In the third drop-down menu on the dialog box, select from Items, Percent, and Sum. You could ask for the top 10 items. You could ask for the top 80% of revenue (which the theory says should be 20% of the customers). Or you could ask for enough customers to reach a sum of $5 million (see Figure 4-26).

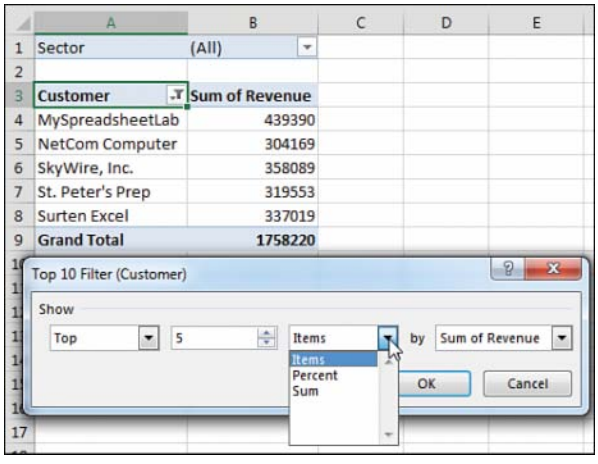



**FIGURE 4-26** Create a report of the top five customers.

The $1,758,220 total shown in cell B9 in Figure 4-26 is the revenue of only the visible customers. It does not include the revenue for the remaining customers. You might want to show the grand total of all customers at the bottom of the list. You have a few options:

- A setting on the Design tab, under the Subtotals drop-down menu, enables you to include values from filtered items in the totals. This option is available only for OLAP data sets and data sets where you choose Add This Data To The Data Model when creating the pivot table.

**Note** See Chapter 10, "Unlocking features with the Data Model and Power Pivot," for more information on working with Power Pivot.



www.itbook.store/books/9781509307241

- You can remove the grand total from the pivot table in Figure 4-27 and build another one-row pivot table just below this data set. Hide the heading row from the second pivot table, and you will appear to have the true grand total at the bottom of the pivot table.
- If you select the blank cell to the right of the last heading (C3 in Figure 4-26), you can turn on the filter on the Data tab. This filter is not designed for pivot tables and is usually grayed out. After you've added the regular filters, open the drop-down menu in B3. Choose Top 10 Filter and ask for the top six items, as shown in Figure 4-27. This returns the top five customers and the grand total from the data set.

**Caution** Be aware that this method is taking advantage of a bug in Excel. Normally, the Filter found on the Data tab is not allowed in a pivot table. If you use this method and later refresh the pivot table, the Excel team will not update the filter for you. As far as they know, the option to filter is grayed out when you are in a pivot table.

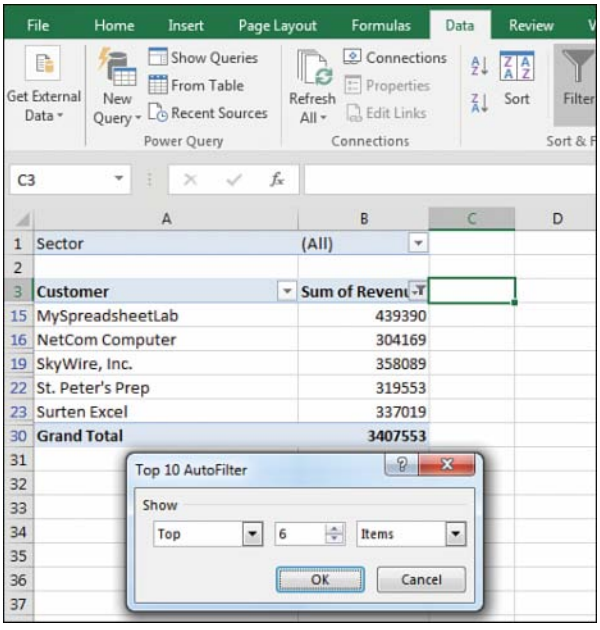



**FIGURE 4-27** You are taking advantage of a hole in the fabric of Excel to apply a regular AutoFilter to a pivot table.

## Filtering using the Date filters in the Label drop-down menu

If your label field contains all dates, Excel replaces the Label Filter flyout with a Date Filters flyout. These filters offer many virtual filters, such as Next Week, This Month, Last Quarter, and so on (see Figure 4-28).



www.itbook.store/books/9781509307241

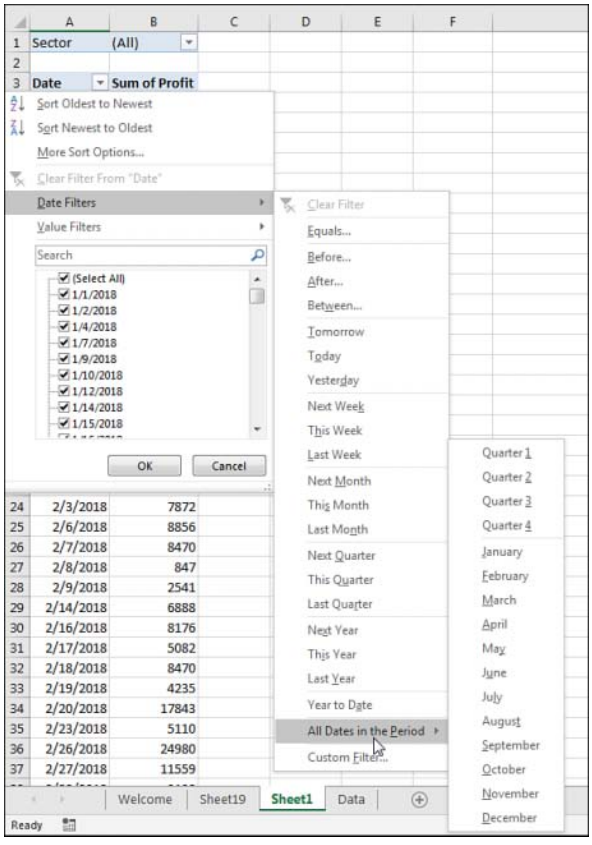



**FIGURE 4-28** The Date Filters menu offers various virtual date periods.

If you choose Equals, Before, After, or Between, you can specify a date or a range of dates.

Options for the current, past, or next day, week, month, quarter, or year occupy 15 options. Combined with Year To Date, these options change day after day. You can pivot a list of projects by due date and always see the projects that are due in the next week by using this option. When you open the workbook on another day, the report recalculates.

**Tip** A week runs from Sunday through Saturday. If you select Next Week, the report always shows a period from the next Sunday through the following Saturday.

When you select All Dates In The Period, a new flyout menu offers options such as Each Month and Each Quarter.



www.itbook.store/books/9781509307241

**Caution** If your date field contains dates and times, the Date Filters might not work as expected. You might ask for dates equal to 4/15/2022, and Excel will say that no records are found. The problem is that 6:00 p.m. on 4/15/2022 is stored internally as 44666.75, with the ".75" representing the 18 hours elapsed in the day between midnight and 6:00 p.m. If you want to return all records that happened at any point on April 15, select the Whole Days check box in the Date Filter dialog box.

## Filtering using the Filters area

Pivot table veterans remember the old Page area section of a pivot table. This area has been renamed the Filters area and still operates basically the same as in legacy versions of Excel. Microsoft did add the capability to select multiple items from the Filters area. Although the Filters area is not as showy as slicers, it is still useful when you need to replicate your pivot table for every customer.

### Adding fields to the Filters area

The pivot table in Figure 4-29 is a perfect ad-hoc reporting tool to give to a high-level executive. He can use the drop-down menus in B1:B4 and E1:E4 to find revenue quickly for any combination of sector, region, market, rep, customer, product, date, or weekday. This is a typical use of filters.

| | A | B | C | D | E |
|---|---|---|---|---|---|
| 1 | Sector | (All) | | Customer | (All) |
| 2 | Region | (All) | | Product | Gizmo |
| 3 | Market | (All) | | Date | (All) |
| 4 | Rep | (All) | | Weekday | Fri |
| 5 | | | | | |
| 6 | Sum of Revenue | Sum of Profit | | | |
| 7 | 274860 | 122640 | | | |

**FIGURE 4-29** With multiple fields in the Filters area, this pivot table can answer many ad-hoc queries.

To set up the report, drag Revenue and Cost to the Values area and then drag as many fields as desired to the Filters area.

If you add many fields to the Filters area, you might want to use one of the obscure pivot table options settings. Click Options on the Analyze tab. On the Layout & Format tab of the PivotTable Options dialog box, change Report Filter Fields per Column from 0 to a positive number. Excel rearranges the Filter fields into multiple columns. Figure 4-29 shows the filters with four fields per column. You can also change Down, Then Over to Over, Then Down to rearrange the sequence of the Filter fields.

### Choosing one item from a filter

To filter the pivot table, click any drop-down menu in the Filters area of the pivot table. The drop-down menu always starts with (All) but then lists the complete unique set of items available in that field.



www.itbook.store/books/9781509307241

## Choosing multiple items from a filter

At the bottom of the Filters drop-down menu is a check box labeled Select Multiple Items. If you select it, Excel adds a check box next to each item in the drop-down menu. This enables you to select multiple items from the list.

In Figure 4-30, the pivot table is filtered to show revenue from multiple sectors, but it is impossible to tell which sectors are included.

| | A | B | C | D | E |
|---|---|---|---|---|---|
| 1 | | | | | |
| 2 | | | | | |
| 3 | | | | | |
| 4 | | | | | |
| 5 | Sector | (Multiple Items) | | Region | Northeast |
| 6 | Market | (Multiple Items) | | Rep | (All) |
| 7 | Product | Gadget | | Customer | (Multiple Items) |
| 8 | Date | (All) | | Weekday | (All) |
| 9 | | | | | |
| 10 | Sum of Revenue | Sum of Cost | | | |
| 11 | 713137 | 395117 | | | |
| 12 | | | | | |

**FIGURE 4-30** You can select multiple items, but after the Filter drop-down menu closes, you cannot tell which items were selected.

**Tip** Selecting multiple items from the filter leads to a situation where the person reading the report will not know which items are included. Slicers solve this problem.

## Replicating a pivot table report for each item in a filter

Although slicers are now the darlings of the pivot table report, the good old-fashioned report filter can still do one trick that slicers cannot do. Say you have created a report that you would like to share with the industry managers. You have a report showing customers with revenue and profit. You would like each industry manager to see only the customers in their area of responsibility.

Follow these steps to quickly replicate the pivot table:

1. Make sure the formatting in the pivot table looks good before you start. You are about to make several copies of the pivot table, and you don't want to format each worksheet in the workbook, so double-check the number formatting and headings now.
2. Add the Sector field to the Filters area. Leave the Sector filter set to (All).
3. Select one cell in the pivot table so that you can see the Analyze tab in the ribbon.
4. Find the Options button in the left side of the Analyze tab. Next to the Options tab is a drop-down menu. Don't click the big Options button. Instead, open the drop-down menu (see Figure 4-31).



www.itbook.store/books/9781509307241

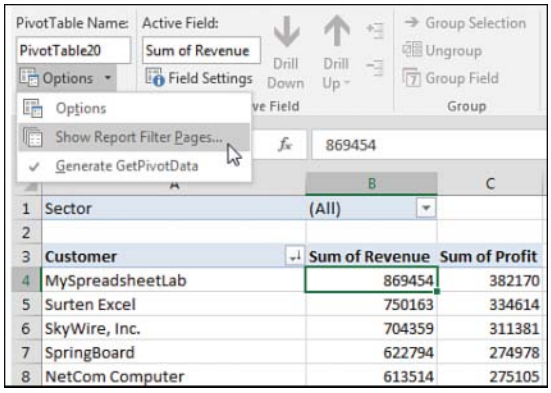



**FIGURE 4-31** Click the tiny drop-down arrow next to the Options button.

5. Choose Show Report Filter Pages. In the Show Report Filter Pages dialog box, you see a list of all the fields in the report area. Because this pivot table has only the Sector field, this is the only choice (see Figure 4-32).

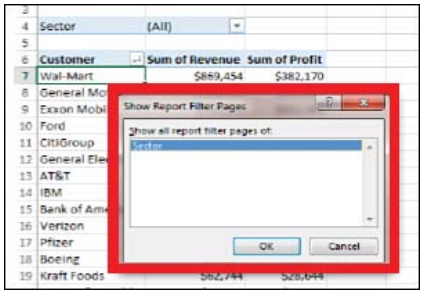



**FIGURE 4-32** Select the field by which to replicate the report.

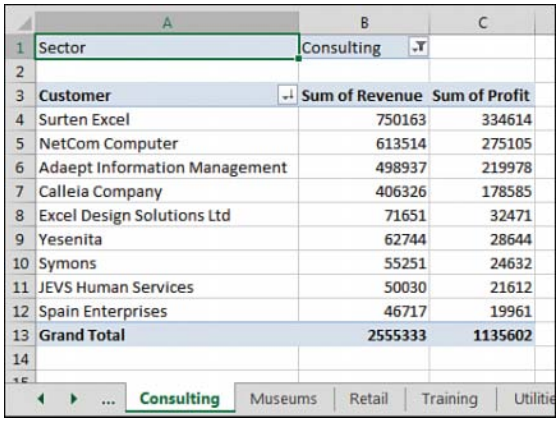
6. Click OK and stand back.

Excel inserts a new worksheet for every item in the Sector field. On the first new worksheet, Excel chooses the first sector as the filter value for that sheet. Excel renames the worksheet to match the sector. Figure 4-33 shows the new Consulting worksheet, with neighboring tabs that contain Museums, Retail, Training, and Utilities.

**Tip** If the underlying data changes, you can refresh all of the Sector worksheets by using Refresh on one Sector pivot table. After you refresh the Consulting worksheet, all the pivot tables refresh.



www.itbook.store/books/9781509307241



| | A | B | C |
|---|---|---|---|
| 1 | Sector | Consulting | |
| 2 | | | |
| 3 | Customer | Sum of Revenue | Sum of Profit |
| 4 | Surten Excel | 750163 | 334614 |
| 5 | NetCom Computer | 613514 | 275105 |
| 6 | Adaept Information Management | 498937 | 219978 |
| 7 | Calleia Company | 406326 | 178585 |
| 8 | Excel Design Solutions Ltd | 71651 | 32471 |
| 9 | Yesenita | 62744 | 28644 |
| 10 | Symons | 55251 | 24632 |
| 11 | JEVS Human Services | 50030 | 21612 |
| 12 | Spain Enterprises | 46717 | 19961 |
| 13 | Grand Total | 2555333 | 1135602 |
| 14 | | | |



**FIGURE 4-33** Excel quickly adds one page per sector.

## Filtering using slicers and timelines

Slicers are graphical versions of the Report Filter fields. Rather than hiding the items selected in the filter drop-down menu behind a heading such as (Multiple Items), the slicer provides a large array of buttons that show at a glance which items are included or excluded.

To add slicers, click the Insert Slicer icon on the Analyze tab. Excel displays the Insert Slicers dialog box. Choose all the fields for which you want to create graphical filters, as shown in Figure 4-34.

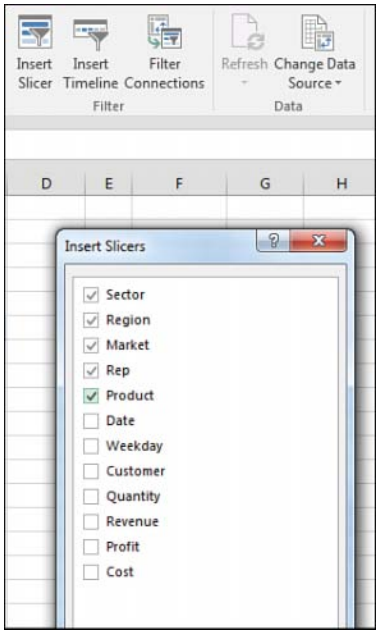



**FIGURE 4-34** Choose fields for slicers.



www.itbook.store/books/9781509307241

Initially, Excel chooses one-column slicers of similar color in a cascade arrangement (see Figure 4-35). However, you can change these settings by selecting a slicer and using the Slicer Tools Options tab in the ribbon.

**FIGURE 4-35** The slicers appear with one column each.

You can add more columns to a slicer. If you have to show 50 two-letter state abbreviations, that will look much better as 5 rows of 10 columns than as 50 rows of 1 column. Click the slicer to get access to the Slicer Tools Analyze tab. Use the Columns spin button to increase the number of columns in the slicer. Use the resize handles in the slicer to make the slicer wider or shorter. To add visual interest, choose a different color from the Slicer Styles gallery for each field.

After formatting the slicers, arrange them in a blank section of the worksheet, as shown in Figure 4-36.

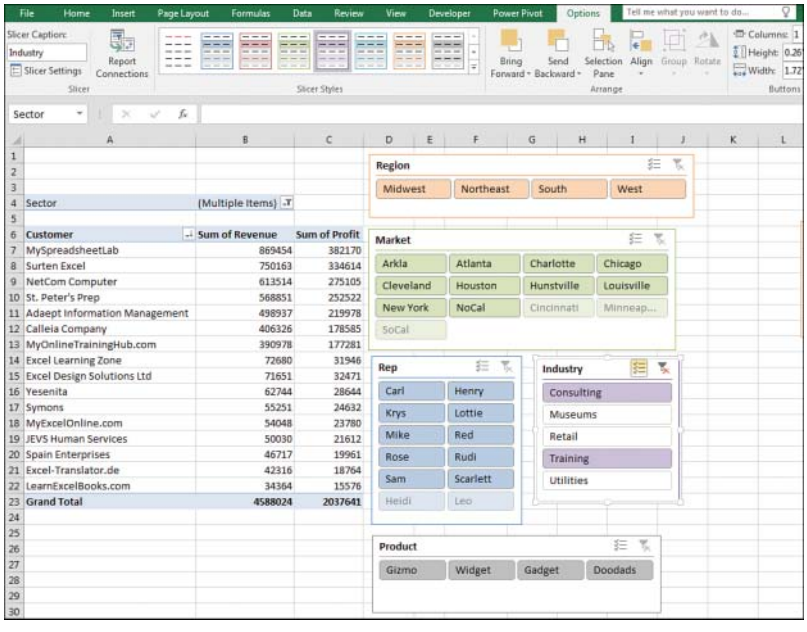



**FIGURE 4-36** After formatting, your slicers might fit on a single screen.



www.itbook.store/books/9781509307241

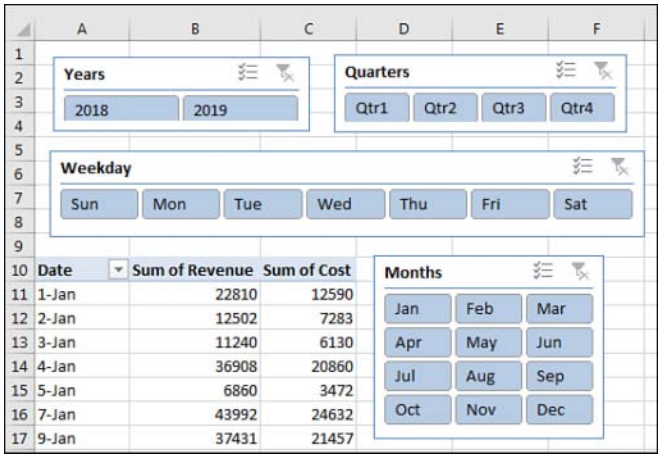
Three colors might appear in a slicer. The dark color indicates items that are selected. Gray boxes often mean the item has no records because of other slicers. White boxes indicate items that are not selected.

Note that you can control the heading for the slicer and the order of items in the slicer by using the Slicer Settings icon on the Slicer Tools Options tab of the ribbon. Just as you can define a new pivot table style, you can also right-click an existing slicer style and choose Duplicate. You can change the font, colors, and so on.

A new icon debuted in Excel 2016, in the top bar of the slicer. The icon appears as three check marks. When you select this icon, you can select multiple items from the slicer without having to hold down the Ctrl key.

## Using timelines to filter by date

After slicers were introduced in Excel 2010, there was some feedback that using slicers was not an ideal way to deal with date fields. You might end up adding some fields to your original data set to show (perhaps) a decade and then use the group feature for year, quarter, and month. You would end up with a whole bunch of slicers all trying to select a time period, as shown in Figure 4-37.




| Date | Sum of Revenue | Sum of Cost |
|---|---|---|
| 1-Jan | 22810 | 12590 |
| 2-Jan | 12502 | 7283 |
| 3-Jan | 11240 | 6130 |
| 4-Jan | 36908 | 20860 |
| 5-Jan | 6860 | 3472 |
| 7-Jan | 43992 | 24632 |
| 9-Jan | 37431 | 21457 |

**FIGURE 4-37** Four different slicers are necessary to filter by date.

For Excel 2013, Microsoft introduced a new kind of filter called a *Timeline slicer*. To use one, select one cell in your pivot table and choose Insert Timeline from the Analyze tab. Timeline slicers can only apply to fields that contain dates. Excel gives you a list of date fields to choose from, although in most cases, there is only one date field from which to choose.

Figure 4-38 shows a Timeline slicer. Perhaps the best part of a Timeline slicer is the drop-down menu that lets you repurpose the timeline for days, months, quarters, or years. This works even if you have not grouped your daily dates up to months, quarters, or years.



www.itbook.store/books/9781509307241

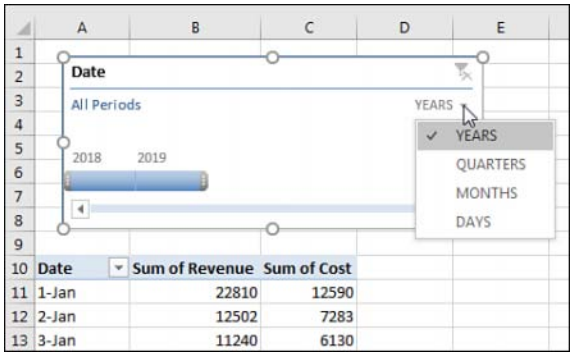



**FIGURE 4-38** A single Timeline slicer can filter your pivot table by month, quarter, year, or day.

## Driving multiple pivot tables from one set of slicers

Chapter 12, "Enhancing pivot table reports with macros," includes a tiny macro that lets you drive two pivot tables with one set of filters. This has historically been difficult to do unless you used a macro.

Now, one set of slicers or timelines can be used to drive multiple pivot tables or pivot charts. In Figure 4-39, the Market slicer is driving three elements. It drives the pivot table in the top left with revenue by sector and product. It drives two pivot tables created for the top-right and lower-left charts.

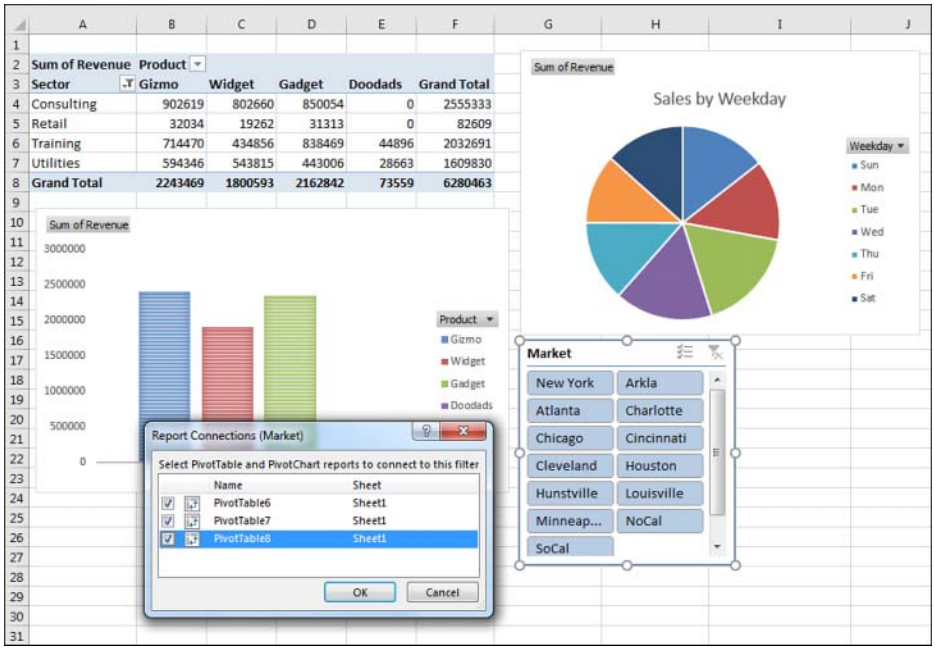



**FIGURE 4-39** Three pivot elements controlled by the same slicer.



www.itbook.store/books/9781509307241

**Note** For more information about how to create pivot charts, refer to Chapter 6, "Using pivot charts and other visualizations."

The following steps show you how to create three pivot tables that are tied to a single slicer:

1. Create your first pivot table.
2. Select a cell in the first pivot table. Choose Insert Slicer. Choose one or more fields to be used as a slicer. Alternatively, insert a Timeline slicer for a date field.
3. Select the entire pivot table.
4. Copy with Ctrl+C or the Copy command.
5. Select a new blank area of the worksheet.
6. Paste. Excel creates a second pivot table that shares the pivot cache with the first pivot table. In order for one slicer to run multiple pivot tables, they must share the same pivot cache.
7. Change the fields in the second pivot table to show some other interesting analysis.
8. Repeat steps 3–7 to create a third copy of the pivot table.

The preceding steps require you to create the slicer after you create the first pivot table but before you make copies of the pivot table.

If you already have several existing pivot tables and need to hook them up to the same slicer, follow these steps:

1. Click the slicer to select it. When the slicer is selected, the Slicer Tools Design tab of the ribbon appears.
2. Select the Slicer Tools Design tab and choose Report Connections. Excel displays the Report Connections (Market) dialog box. Initially, only the first pivot table is selected.
3. As shown in Figure 4-40, choose the other pivot tables in the dialog box and click OK.

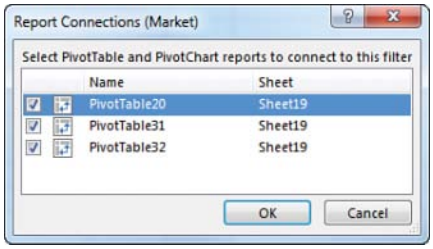



**FIGURE 4-40** Choose to hook this slicer up to the other pivot tables.

4. If you created multiple slicers and/or timelines, repeat steps 1 through 3 for the other slicers.



www.itbook.store/books/9781509307241

The result is a dashboard in which all of the pivot tables and pivot charts update in response to selections made in the slicer (see Figure 4-41).

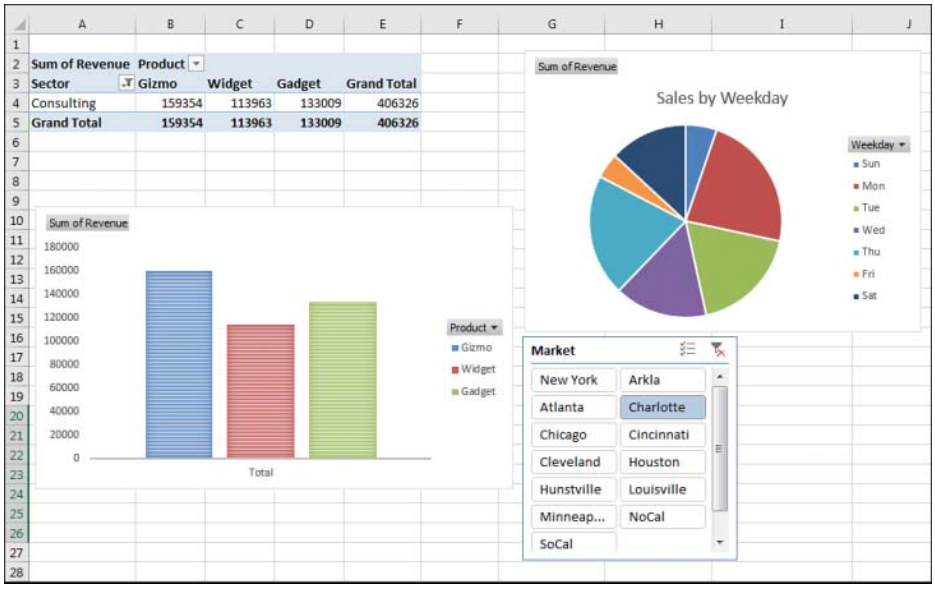



**FIGURE 4-41** All of the pivot charts and pivot tables update when you choose from the slicer.

**Tip** The worksheet in Figure 4-41 would be a perfect worksheet to publish to SharePoint or to your OneDrive. You can share the workbook with coworkers and allow them to interact with the slicers. They won't need to worry about the underlying data or enter any numbers; they can just click on the slicer to see the reports update.

## Grouping and creating hierarchies in a pivot table

Pivot tables have the ability to do roll-ups in memory. You can roll daily dates up to weeks, months, quarters, or years. Time can roll up to minutes or hours. Numbers can be grouped into equal-size buckets. Text entries can be grouped into territories.

You can use the Power Pivot grid to define a hierarchy so you can quickly drill down on a pivot table or chart.

### Grouping numeric fields

The Grouping dialog box for numeric fields enables you to group items into equal ranges. This can be useful for creating frequency distributions. The pivot table in Figure 4-42 is quite the opposite of anything you've seen so far in this book. The numeric field—Revenue—is in the Rows area. A text field—



www.itbook.store/books/9781509307241

Customer—is in the Values area. When you put a text field in the Values area, you get a count of how many records match the criteria. In its present state, this pivot table is not that fascinating; it is telling you that exactly one record in the database has a total revenue of $23,990.

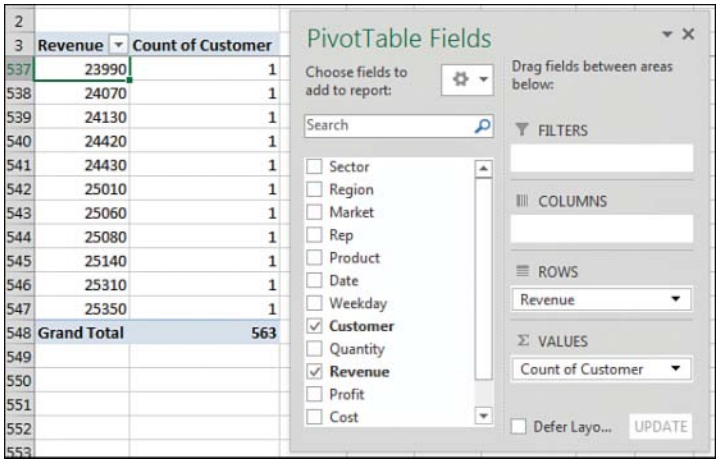



**FIGURE 4-42** Nothing interesting here—just lots of order totals that appear exactly one time in the database.

Select one number in column A of the pivot table. Select Group Field from the Analyze tab of the ribbon. Because this field is not a date field, the Grouping dialog box offers fields for Starting At, Ending At, and By. As shown in Figure 4-43, you can choose to show amounts from 0 to 30,000 in groups of 5,000.

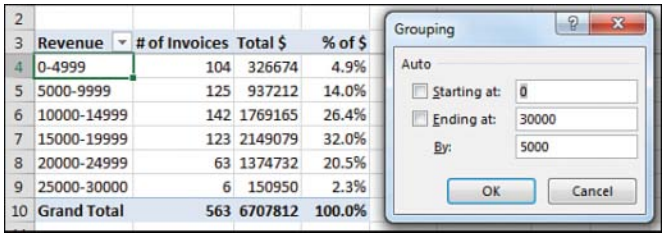



**FIGURE 4-43** Create a frequency distribution by grouping the order size into $5,000 buckets.

After grouping the order size into buckets, you might want to add additional fields, such as Revenue and % Of Revenue shown as a percentage of the total.

**Note** The grouping dialog box requires all groups to be the same size. I have heard questions where people want to group into 0–100K, 200K–500K, but this is not possible using the Grouping feature. You would have to add a new column to the source data in order to create these groupings.

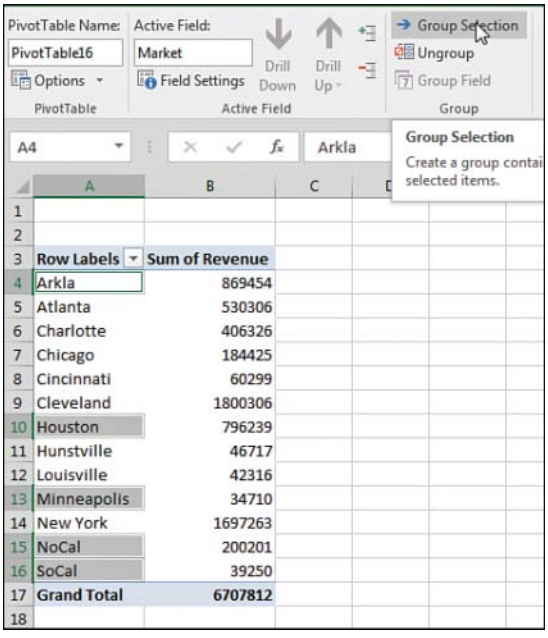


www.itbook.store/books/9781509307241

## Case Study: Grouping text fields for redistricting

Say that you get a call from the VP of Sales. The Sales Department is secretly considering a massive reorganization of the sales regions. The VP would like to see a report showing revenue after redistricting. You have been around long enough to know that the proposed regions will change several times before the reorganization happens, so you are not willing to change the Region field in your source data quite yet.

First, build a report showing revenue by market. The VP of Sales is proposing eliminating two regional managers and redistricting the country into three super-regions. While holding down the Ctrl key, highlight the five regions that will make up the new West region. Figure 4-44 shows the pivot table before the first group is created.




| | A | B | C |
|---|---|---|---|
| 1 | | | |
| 2 | | | |
| 3 | Row Labels | Sum of Revenue | |
| 4 | Arkla | 869454 | |
| 5 | Atlanta | 530306 | |
| 6 | Charlotte | 406326 | |
| 7 | Chicago | 184425 | |
| 8 | Cincinnati | 60299 | |
| 9 | Cleveland | 1800306 | |
| 10 | Houston | 796239 | |
| 11 | Hunstville | 46717 | |
| 12 | Louisville | 42316 | |
| 13 | Minneapolis | 34710 | |
| 14 | New York | 1697263 | |
| 15 | NoCal | 200201 | |
| 16 | SoCal | 39250 | |
| 17 | Grand Total | 6707812 | |
| 18 | | | |

**FIGURE 4-44** Use the Ctrl key to select the noncontiguous cells that make up the new region.

From the Analyze tab, click Group Selection. Excel adds a new field called Market2. The five selected regions are arbitrarily rolled up to a new territory called Group1. In Figure 4.45, the Group1 label in A4 is the first item in the new Market2 virtual field. The other items in the Market2 field includee Atlanta in A10, Charlotte in A12 and so on. The similar items in A11 and A13 are items in the original Market field. Use care while holding down the Ctrl key to select the unbolded markets for the South region: Atlanta in row 11, Charlotte in row 13, Huntsville in row 11, and Louisville in row 23...

Click Group Selection to group the markets in the proposed Southeast region. Repeat to group the remaining regions into the proposed Northeast region. Figure 4-46 shows what it looks like when you have grouped the markets into new regions. Five things need further



www.itbook.store/books/9781509307241

adjustment: the names of Group1, Group2, Group3, and Market2, and the lack of subtotals for the outer row field.

| Row Labels | Sum of Revenue |
|---|---|
| Group1 | |
| Arkla | 869454 |
| Houston | 796239 |
| Minneapolis | 34710 |
| NoCal | 200201 |
| SoCal | 39250 |
| Atlanta | |
| Atlanta | 530306 |
| Charlotte | |
| Charlotte | 406326 |
| Chicago | |
| Chicago | 184425 |
| Cincinnati | |
| Cincinnati | 60299 |
| Cleveland | |
| Cleveland | 1800306 |
| Hunstville | |
| Hunstville | 46717 |
| Louisville | |
| Louisville | 42316 |
| New York | |
| New York | 1697263 |
| Grand Total | 6707812 |

**FIGURE 4-45** The first super-region is arbitrarily called Group1.

| Row Labels | Sum of Revenue |
|---|---|
| Group1 | |
| Arkla | 869454 |
| Houston | 796239 |
| Minneapolis | 34710 |
| NoCal | 200201 |
| SoCal | 39250 |
| Group2 | |
| Atlanta | 530306 |
| Charlotte | 406326 |
| Hunstville | 46717 |
| Louisville | 42316 |
| Group3 | |
| Chicago | 184425 |
| Cincinnati | 60299 |
| Cleveland | 1800306 |
| New York | 1697263 |
| Grand Total | 6707812 |

**FIGURE 4-46** The markets are grouped, but you have to do some cleanup.

Cleaning up the report takes only a few moments:

1. Select cell A4. Type **West** to replace the arbitrary name Group1.
2. Select cell A10. Type **Southeast** to replace the arbitrary name Group2.



www.itbook.store/books/9781509307241

3. Select A15. Type **Northeast** to replace Group3.
4. Select any outer heading in A4, A10, or A15. Click Field Settings on the Analyze tab.
5. In the Field Settings dialog box, replace the Custom Name of Market2 with Proposed Region. Also, in the Field Settings dialog box, change the Subtotals setting from None to Automatic.

Figure 4-47 shows the pivot table that results, which is ready for the VP of Sales.

| | Row Labels | Sum of Revenue |
|---|---|---|
| 4 | ⊟West | 1939854 |
| 5 | Arkla | 869454 |
| 6 | Houston | 796239 |
| 7 | Minneapolis | 34710 |
| 8 | NoCal | 200201 |
| 9 | SoCal | 39250 |
| 10 | ⊟Southeast | 1025665 |
| 11 | Atlanta | 530306 |
| 12 | Charlotte | 406326 |
| 13 | Hunstville | 46717 |
| 14 | Louisville | 42316 |
| 15 | ⊟Northeast | 3742293 |
| 16 | Chicago | 184425 |
| 17 | Cincinnati | 60299 |
| 18 | Cleveland | 1800306 |
| 19 | New York | 1697263 |
| 20 | Grand Total | 6707812 |

**FIGURE 4-47** It is now easy to see that these regions are heavily unbalanced.

You can probably predict that the Sales Department needs to shuffle markets to balance the regions. To go back to the original regions, select any Proposed Region cell in A4, A10, or A15 and choose Ungroup. You can then start over, grouping regions in new combinations.

## Grouping date fields manually

Excel provides a straightforward way to group date fields. Select any date cell in your pivot table. On the Analyze tab, click Group Field in the Group option.

When your field contains date information, the date version of the Grouping dialog box appears. By default, the Months option is selected. You have choices to group by Seconds, Minutes, Hours, Days, Months, Quarters, and Years. It is possible—and usually advisable—to select more than one field in the Grouping dialog box. In this case, select Months and Years, as shown in Figure 4-48.

There are several interesting points to note about the resulting pivot table. First, notice that the Years field has been added to the PivotTable Fields list. Don't let this fool you. Your source data is not changed to include the new field. Instead, this field is now part of your pivot cache in memory.



www.itbook.store/books/9781509307241

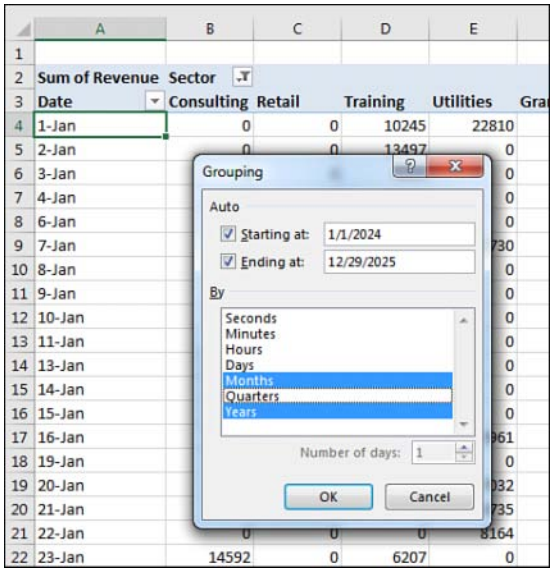



**FIGURE 4-48** Business users of Excel usually group by months (or quarters) and years.

Another interesting point is that, by default, the Years field is automatically added to the same area as the original date field in the pivot table layout, as shown in Figure 4-49. Although this happens automatically, you are free to pivot months and years onto the opposite axis of the report. This is a quick way to create a year-over-year sales report.

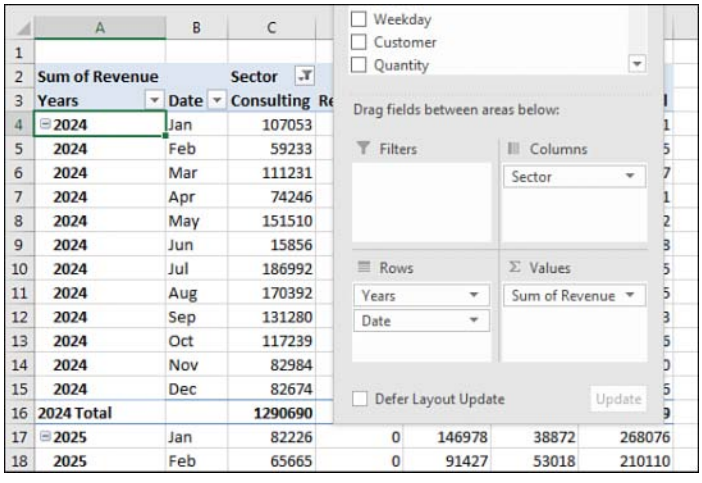



**FIGURE 4-49** By default, Excel adds the new grouped date field to your pivot table layout.



www.itbook.store/books/9781509307241

## Including years when grouping by months

Although this point is not immediately obvious, it is important to understand that if you group a date field by month, you also need to include the year in the grouping. If your data set includes January 2024 and January 2025, selecting only months in the Grouping dialog box will result in both January 2024 and January 2025 being combined into a single row called January (see Figure 4-50).

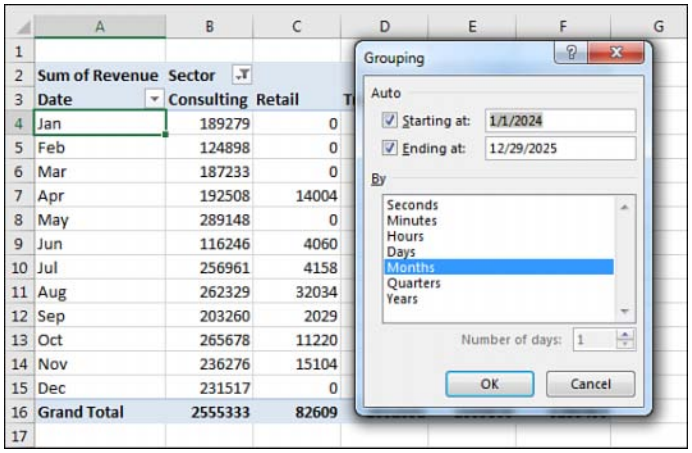



**FIGURE 4-50** If you fail to include the Year field in the grouping, the report mixes sales from last January and this January into a single row called January.

## Grouping date fields by week

The Grouping dialog box offers choices to group by second, minute, hour, day, month, quarter, and year. It is also possible to group on a weekly or biweekly basis.

The first step is to find either a paper calendar or an electronic calendar, such as the Calendar feature in Outlook, for the year in question. If your data starts on January 1, 2024, it is helpful to know that January 1 is a Monday that year. You need to decide if weeks should start on Sunday or Monday or any other day. For example, you can check the paper or electronic calendar to learn that the nearest starting Sunday is December 31, 2023.

Select any date heading in your pivot table. Then select Group Field from the Analyze tab. In the Grouping dialog box, clear all the By options and select only the Days field. This enables the spin button for Number of Days. To produce a report by week, increase the number of days from 1 to 7.

Next, you need to set up the Starting At date. If you were to accept the default of starting at January 1, 2024, all your weekly periods would run from Monday through Sunday. By checking a calendar before you begin, you know that you want the first group to start on December 31, 2023, to have weeks that run Sunday through Monday. Figure 4-51 shows the settings in the Grouping dialog box and the resulting report.



www.itbook.store/books/9781509307241

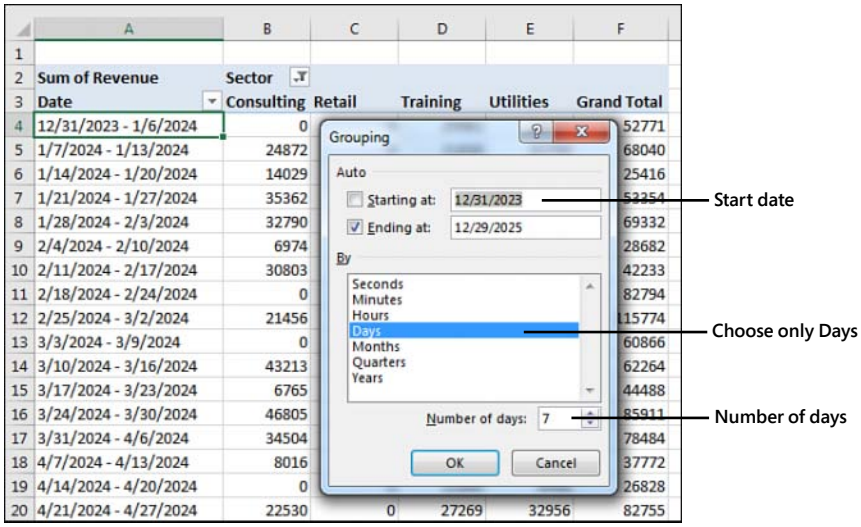



**FIGURE 4-51** Group dates up to weekly periods.

**Caution** If you choose to group by week, none of the other grouping options can be selected. You cannot group this or any field by month, quarter, or year. You cannot add calculated items to the pivot table.

## AutoGrouping pivot table dates

Excel 2016 introduced an AutoGroup feature for dates. If you dragged a date field to a pivot table, Excel would quickly add date rollups and define a hierarchy for the dates.

The feature was turned on by default, and the only way to turn it off was a change in the Registry.

I love the concept of teaching people that daily dates can easily be rolled up. But for the people who needed to report daily dates, the AutoGroup was inconsistent and confusing. The logic used to choose which rollups would be present would sometimes leave out daily dates from the hierarchy.

Today, Excel 2019 will not automatically AutoGroup. You can choose to allow the AutoGroup if you loved this feature. Go To File, Options, Data, and deselect Disable Automatic Grouping Of Date/Time Columns In Pivot Tables.

## Understanding how Excel decides what to AutoGroup

If you have daily dates that include an entire year or that fall in two or more years, Excel 2019 groups the daily dates to include years, quarters, and months. If you need to report by daily dates, you will have to select any date cell, choose Group Field, and add Days. Note that the rules change if your data is in the Data Model. In that case, AutoGroup would include daily dates as well.



www.itbook.store/books/9781509307241

If you have daily dates that fall within one calendar year and span more than one month, Excel groups the daily dates to month and includes daily dates.

**Caution** If your company is closed on New Year's Day and you have no sales on January 1, a data set that stretches from January 2 to December 31 will fit the "less than a full year" case and will include months and daily dates.

If your data contains times that do not cross over midnight, you get hours, minutes, and seconds. If the times span more than one day, you get days, hours, minutes, and seconds.

## Using AutoGroup

Say that you have a column in your data set with daily dates that span two years. When you add this Date field to the Rows area of your pivot table, you will see rows for each year instead of hundreds of daily dates. If your pivot table is in Tabular layout, you will see extra columns for Quarter and Date that appear to have no data (see Figure 4-52).

When you look in the Pivot Table Fields list, you see that the Rows area automatically includes three fields: Years, Quarter, and Date. All three of these are virtual fields created by grouping the daily dates up to months, quarters, and years.

The three fields are added to either the Rows area or the Columns area. However, only the highest level of the date field will be showing. To see the quarters and years, click one cell that contains a year and then click the Expand button in the Analyze tab of the ribbon (see Figure 4-53). To see months, select a cell containing a quarter and click the Expand button again (see Figure 4-54).

| | A | B | C | D | E | F | G | H |
|---|---|---|---|---|---|---|---|---|
| 1 | | | | | | | | |
| 2 | | | | | | | | |
| 3 | Sum of Revenue | | | Region | | | | |
| 4 | Years | Quarter | Date | West | Midwest | Northeast | South | Grand Total |
| 5 | ⊞2024 | | | 127340 | 972790 | 897378 | 1410045 | 3407553 |
| 6 | ⊞2025 | | | 112111 | 1149266 | 799885 | 1238997 | 3300259 |
| 7 | Grand Total | | | 239451 | 2122056 | 1697263 | 2649042 | 6707812 |
| 8 | | | | | | | | |

**FIGURE 4-52** Excel can automatically groups two years' worth of daily dates up to months, quarters, and years



www.itbook.store/books/9781509307241

| | A | B | C | D | E | F | G | H |
|---|---|---|---|---|---|---|---|---|
| 1 | | | | | | | | |
| 2 | | | | | | | | |
| 3 | Sum of Revenue | | | Region | | | | |
| 4 | Years | Quar | Date | West | Midwest | Northeast | South | Grand Total |
| 5 | 2024 | Qtr1 | | 50456 | 305554 | 200651 | 298422 | 855083 |
| 6 | 2024 | Qtr2 | | 14548 | 255161 | 164685 | 339891 | 774285 |
| 7 | 2024 | Qtr3 | | 35696 | 240744 | 252185 | 425327 | 953952 |
| 8 | 2024 | Qtr4 | | 26640 | 171331 | 279857 | 346405 | 824233 |
| 9 | 2024 Total | | | 127340 | 972790 | 897378 | 1410045 | 3407553 |
| 10 | 2025 | Qtr1 | | 26874 | 236872 | 241157 | 223159 | 728062 |
| 11 | 2025 | Qtr2 | | 22917 | 312764 | 195775 | 289873 | 821329 |
| 12 | 2025 | Qtr3 | | 34220 | 277681 | 111477 | 376440 | 799818 |
| 13 | 2025 | Qtr4 | | 28100 | 321949 | 251476 | 349525 | 951050 |
| 14 | 2025 Total | | | 112111 | 1149266 | 799885 | 1238997 | 3300259 |
| 15 | Grand Total | | | 239451 | 2122056 | 1697263 | 2649042 | 6707812 |
| 16 | | | | | | | | |

**FIGURE 4-53** Use Expand Field to show the quarters.

| | A | B | C | D | E | F | G | H |
|---|---|---|---|---|---|---|---|---|
| 1 | | | | | | | | |
| 2 | | | | | | | | |
| 3 | Sum of Revenue | | | Region | | | | |
| 4 | Years | Quar | Date | West | Midwest | Northeast | South | Grand Total |
| 5 | 2024 | Qtr1 | Jan | 21730 | 144169 | 60482 | 46841 | 273222 |
| 6 | 2024 | Qtr1 | Feb | 20610 | 98554 | 54552 | 138349 | 312065 |
| 7 | 2024 | Qtr1 | Mar | 8116 | 62831 | 85617 | 113232 | 269796 |
| 8 | 2024 | Qtr1 Total | | 50456 | 305554 | 200651 | 298422 | 855083 |
| 9 | 2024 | Qtr2 | Apr | 4948 | 93796 | 55909 | 121987 | 276640 |
| 10 | 2024 | Qtr2 | May | 4846 | 103775 | 43518 | 179937 | 332076 |

**FIGURE 4-54** Expand Field again to show the monthly data.

## Creating an easy year-over-year report

You can use date grouping to easily create a year-over-year report. You can either manually group the dates to years or use the AutoGroup.

Follow these steps:

1. Create a pivot table with Years in the Columns area and Months in the Rows area. Drag Revenue to the Values area. By default, the pivot table will offer a Grand Total column, as shown in Figure 4-55.
2. Right-click the Grand Total heading and choose Remove Grand Total.
3. Drag Revenue a second time to the Values area.
4. In the Columns area, drag Years so it is below Values. You will have the pivot table shown in Figure 4-56.



www.itbook.store/books/9781509307241

| | A | B | C | D | E |
|---|---|---|---|---|---|
| 1 | | | | | |
| 2 | | | | | |
| 3 | Sum of Revenue | Years | | | |
| 4 | Date | 2024 | 2025 | Grand Total | |
| 5 | Jan | 273222 | 274936 | 548158 | |
| 6 | Feb | 312065 | 236565 | 548630 | |
| 7 | Mar | 269796 | 216561 | 486357 | |
| 8 | Apr | 276640 | 292003 | 568643 | |
| 9 | May | 332076 | 287443 | 619519 | |
| 10 | Jun | 165569 | 241883 | 407452 | |
| 11 | Jul | 385767 | 295851 | 681618 | |
| 12 | Aug | 311745 | 286891 | 598636 | |
| 13 | Sep | 256440 | 217076 | 473516 | |
| 14 | Oct | 304246 | 308986 | 613232 | |
| 15 | Nov | 231872 | 301880 | 533752 | |
| 16 | Dec | 288115 | 340184 | 628299 | |
| 17 | Grand Total | 3407553 | 3300259 | 6707812 | |
| 18 | | | | | |

**FIGURE 4-55** Group daily dates to months and years. Drag Years to go across the report.

| | A | B | C | D | E |
|---|---|---|---|---|---|
| 1 | | | | | |
| 2 | | | | | |
| 3 | | Values | Years | | |
| 4 | | Sum of Revenue | | Sum of Revenue2 | |
| 5 | Date | 2024 | 2025 | 2024 | 2025 |
| 6 | Jan | 273222 | 274936 | 273222 | 274936 |
| 7 | Feb | 312065 | 236565 | 312065 | 236565 |
| 8 | Mar | 269796 | 216561 | 269796 | 216561 |
| 9 | Apr | 276640 | 292003 | 276640 | 292003 |
| 10 | May | 332076 | 287443 | 332076 | 287443 |
| 11 | Jun | 165569 | 241883 | 165569 | 241883 |
| 12 | Jul | 385767 | 295851 | 385767 | 295851 |
| 13 | Aug | 311745 | 286891 | 311745 | 286891 |
| 14 | Sep | 256440 | 217076 | 256440 | 217076 |
| 15 | Oct | 304246 | 308986 | 304246 | 308986 |
| 16 | Nov | 231872 | 301880 | 231872 | 301880 |
| 17 | Dec | 288115 | 340184 | 288115 | 340184 |
| 18 | Grand Total | 3407553 | 3300259 | 3407553 | 3300259 |
| 19 | | | | | |

**FIGURE 4-56** This year and last year appear twice across the top of the report.

5. Double-click the Sum of Revenue2 heading in cell D4 to display the Value Field Settings dialog box.

6. In the Value Field Settings dialog box, select the Show Values As tab. In the Show Values As drop-down menu, choose % Difference From. In the Base Field list, choose Years. In the Base Item, choose (Previous), as shown in Figure 4-57.



www.itbook.store/books/9781509307241

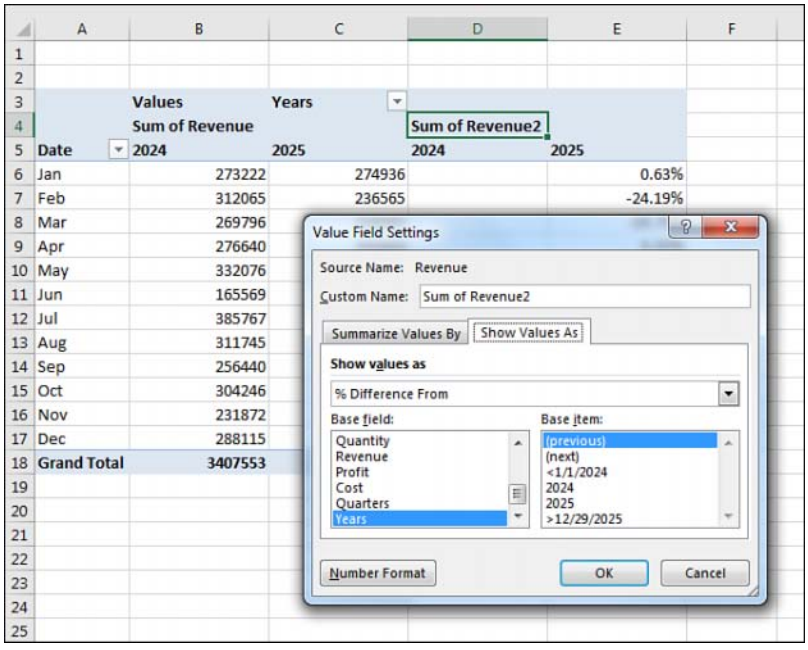



**FIGURE 4-57** Change the second Revenue columns to percentage difference from the previous year.

7. Close the Value Field Settings dialog box. Column E will show the percentage change from the first year to the last year. Column D will be blank because the pivot table has no data from 2023 to use to compare to 2024.

8. Hide column D.

9. Select the 2025 heading in E5. Press Ctrl+1 for Format Cells. On the Number tab, choose Custom. Type a format of **;;;"% Change"**.

You have a report showing year 1 versus year 2 and a percentage change. You can easily remove the Months from column A and insert Region, Market, or Product to see the year-over-year change. Figure 4-58 shows a year-over-year report for Regions.

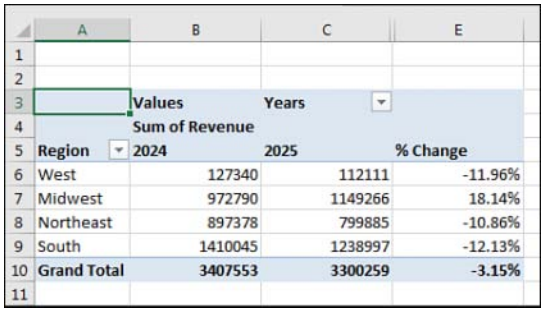



**FIGURE 4-58** Once you have the year-over-year report set up, you can swap any field in to column A.



www.itbook.store/books/9781509307241

## Creating hierarchies

Back in Figures 4-53 through 4-55, you used the Expand Field to drill in to different date levels. If you build your pivot table using the Data Model, you can use the Diagram View in Power Pivot to create a formal hierarchy. Once you have a hierarchy in your pivot table, you can use the Drill Down and Drill Up buttons that are perpetually grayed out in the ribbon.

Consider the pivot table and pivot chart shown in Figure 4-59. The pivot table is built using the Data Model; when you choose Insert Pivot Table, make sure to choose Add This Data To The Data Model. The pivot table has regions in the Rows area and Products in the Columns area. The pivot chart is showing a stacked column chart.

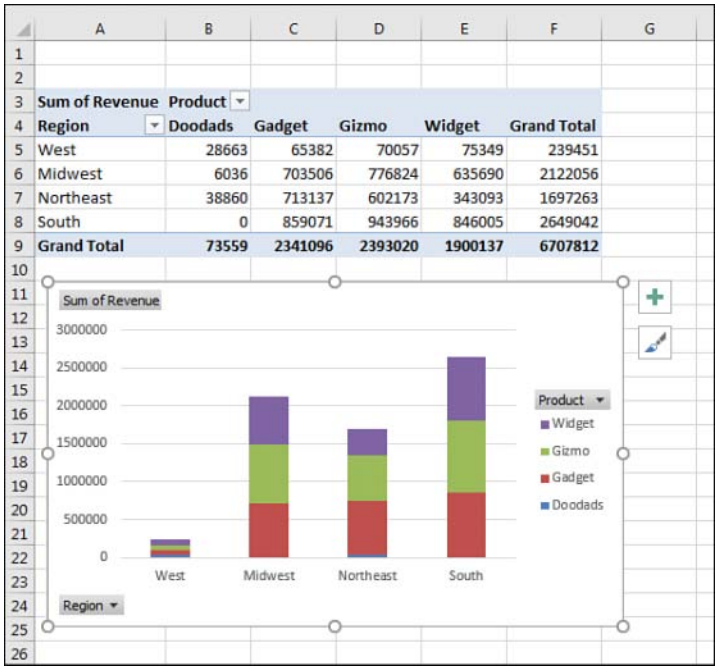



**FIGURE 4-59** A pivot table and a pivot chart without any hierarchy.

Follow these steps to add a hierarchy below Region:

1. Click the Manage icon in the Power Pivot tab of the ribbon.
2. On the Home tab of the Power Pivot for Excel window, click Diagram View.
3. Resize the Range table so you can see all the fields.
4. Click on the top field for the hierarchy: Region. Ctrl+click the remaining members of the hierarchy: Market and Rep.
5. Right-click on Region and choose Create Hierarchy (see Figure 4-60).



www.itbook.store/books/9781509307241

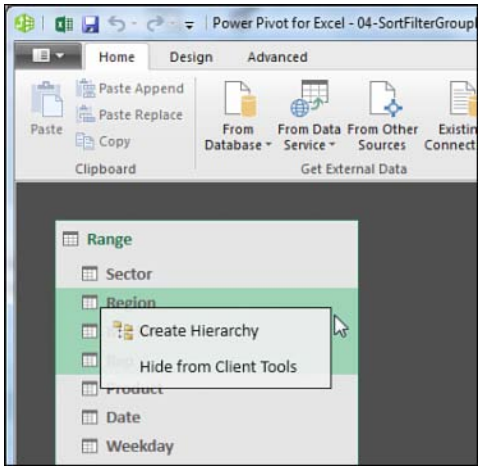



**FIGURE 4-60** Select Region, Market, and Rep. Right-click and choose Create Hierarchy.

6. Hierarchy1 will appear at the bottom of the table. Right-click the name and choose Rename. Type a meaningful name such as Geography (see Figure 4-61).

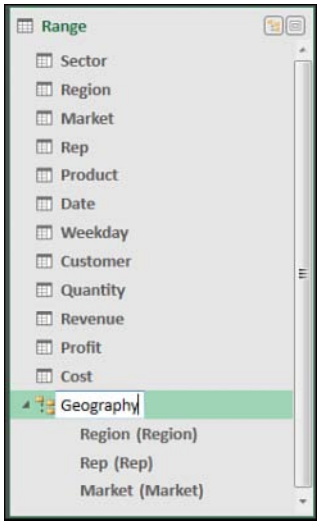



**FIGURE 4-61** The hierarchy is shown at the bottom of the table.

7. Carefully review the sequence of the hierarchy. In Figure 4-61, Rep is appearing before Market. This is incorrect. Right-click on Market and choose Move Up.

8. Close the Power Pivot window and return to Excel. After a brief pause, the PivotTable Fields list will show the table name (Range), the hierarchy name (Geography), and something called More Fields.



www.itbook.store/books/9781509307241

9. Remove Region from the Rows area. Choose the Geography hierarchy from the PivotTable Fields list. As shown in Figure 4-62, you have something very similar to Figure 4-59. However, note that Drill Down is now enabled in the ribbon.

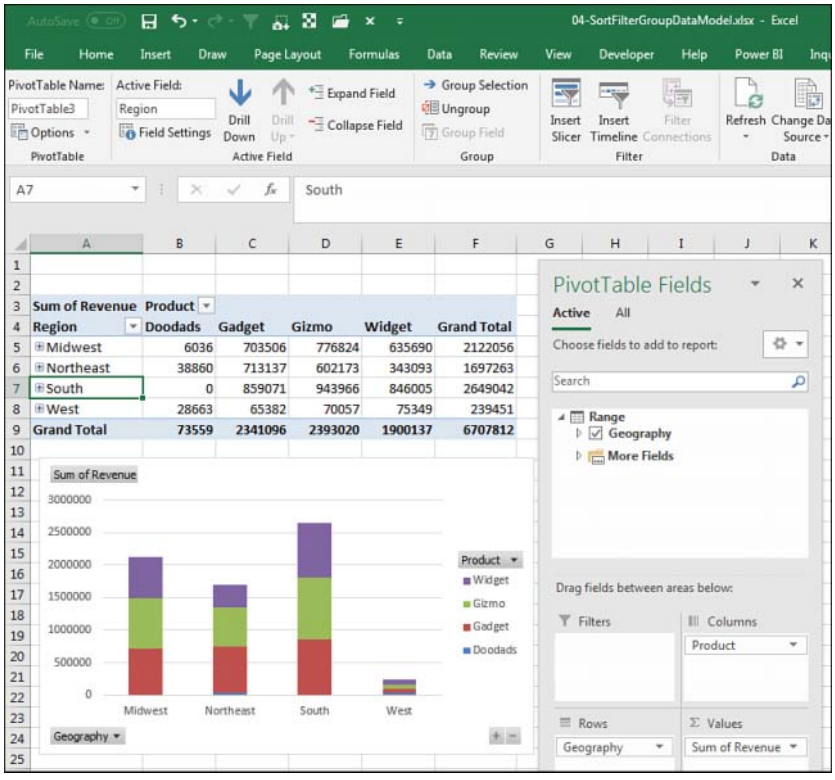



**FIGURE 4-62** Plus signs appear next to each region. The Drill Down icon is enabled.

10. Select cell A7 for South. Click on Drill Down. The pivot table and pivot chart will change to show the markets in the South region (see Figure 4-63).

You can keep using Drill Down or Drill Up to travel through the hierarchy.



www.itbook.store/books/9781509307241

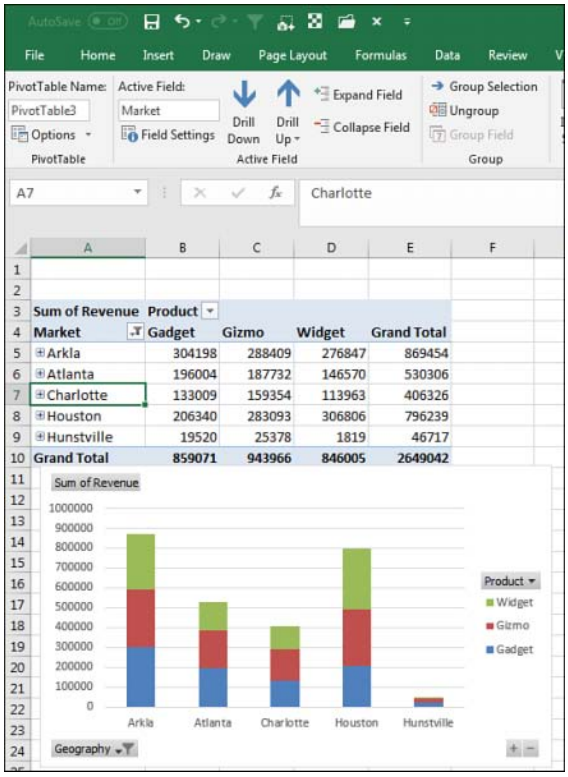



**FIGURE 4-63** After drilling down on the South region, the markets in the South appear. The Drill Up icon is now enabled.

## Next steps

In Chapter 5, "Performing calculations in pivot tables," you'll learn how to use pivot table formulas to add new virtual fields to a pivot table.



www.itbook.store/books/9781509307241

# Index

## Symbols

% Difference From option (Value Field Settings dialog box, Show Values As tab), 68-69
% Of option (Value Field Settings dialog box, Show Values As tab), 66
% Of Parent Column option (Value Field Settings dialog box, Show Values As tab), 69
% Of Parent Row option (Value Field Settings dialog box, Show Values As tab), 69
% Of Parent Total option (Value Field Settings dialog box, Show Values As tab), 69
% Of Total option (Value Field Settings dialog box, Show Values As tab), 66

## Numbers

3D Map, 289
    aerial photography maps, 295
    animating data over time, 297-298
    annotation (text boxes), 294, 299
    bubble charts, 294
    column charts, 292, 296
    combining data sets, 297
    custom maps, 290
    custom shapes, 290
    data cards (tooltips), 296
    filters, 296
    flat maps, 295-296
    geocoding data, 290-291
    heat maps, 294
    hiding
        legends, 296
        panes, 296
    labeling
        data points, 294
        maps, 295
    latitude, 290
    legends
        hiding, 296
        resizing, 296
    longitude, 290
    navigating maps, 292-293
    pie charts, 294
    preparing data for, 289
    region maps, 294



www.itbook.store/books/9781509307241

relationships (table), 290
resizing legends, 296
store maps, using instead of globes (case study), 299-302
table relationships, 290
timelines, 298
tours, creating, 298-299
vantage point, moving, 293
video, creating, 299
zooming in/out of maps, 293
32-bit Excel
Data Model and, 287
Power Pivot and, 287

# A

Access (MS), creating pivot tables, 181-184
ActiveX controls versus form controls, 307
adding
calculated columns in Power Pivot grid, 281-282
calculations to OLAP pivot tables, 250
columns
calculated columns in Power Pivot grid, 281-282
to slicers, 100
with Power Query, 275-276
fields
model fields to pivot tables, 383
numeric fields to Values area, 384
rank number fields to pivot tables, 396-398
to data areas, 332-333
to reports, 22-24
functionality to recorded macros, 308-309
layers to reports, 25
linked tables to Data Model, 279
model fields to pivot tables, 383
numeric fields to Values area, 384
rank number fields to pivot tables, 396-398
scrollbars to spreadsheets, 309-312
tables to Data Model, 180, 279, 381
add-ins (Power Query), 188
Advanced Query Editor (Power Query), 195
aerial photography maps in 3D Map, 295
Allington, Matt, 287
analyzing OLAP pivot table data (what-if analysis), 258-259
animation in 3D Map, 297-298
annotation (text boxes) in 3D Map, 294, 299
applied steps (Power Query), 194-195, 276
Areas section drop-downs (Field list), 78-79
arrow keys in formula creation, 286
artificial intelligence. *See* Insights feature
AutoComplete tool (VBA), 326
auto date-grouping, 75
AutoFiltering pivot tables, 401-404
AutoFit, column widths, 59
AutoGroup, 330
date groups, 344
determining AutoGroup criteria, 111
using, 112
year-over-year reports, creating, 113-115
AutoShow (VBA), executive overviews of pivot tables, 365-367
AutoSort, pivot table sort order, 347

# B

backward compatibility
Check Compatibility tool, 7-9
pivot tables and Excel, 7-8
Timeline slicer, 35



www.itbook.store/books/9781509307241

basic pivot table creation, 19
adding
fields to reports, 22
layers to reports, 25
choosing report location, 20
classic pivot table layout, 26-27
data selection, 20
fields
adding to reports, 24
dragging/dropping in reports, 25-26
filters, creating, 27
Ideas feature, 29-30
laying out reports, 22-24
deferring layout updates, 39-40
starting over, 40
PivotTable Fields list, 21-22
adding fields to tables, 24
dragging/dropping fields in tables, 25-26
rearranging tables, 25-26
Recommended PivotTables, 28-30
slicers
connecting to multiple pivot tables, 32-33
standard slicers, 31-33
Timeline slicer, 34-35
big data files, processing with Power Query, 273-275
blank cells
deleting from pivot tables, 346-347
filling
in data area, 336
in row area, 336
in data sources, 14
in numeric columns, 24
replacing with zeros, 47-48
blank rows (layouts), 50, 56-57
bubble charts in 3D Map, 294

# C

calculated columns, adding in Power Pivot grid, 281-282
calculated fields, 286
calculated data fields, 358-359
creating, 123-128
DAX measures, using instead of calculated fields (case study), 141-145
defined, 121
inserting into pivot tables, 124-125
manually adding to data sources, 122-123
rules specific to, 139-140
summarizing next year's forecast (case study), 129-133
calculated items, 286
changing solve order of, 147
creating, 133-137
defined, 121
rules for, 145-146
calculated measures (OLAP), 250-253
calculated members (OLAP), 250, 254-257
calculations, 355, 384. *See also* measures
adding to OLAP pivot tables, 250
calculated fields, 286
calculated data fields, 358-359
creating, 123-128
creating with formulas outside a pivot table, 123, 124
defined, 121
inserting into pivot tables, 124-125
manually adding to data sources, 122-123



www.itbook.store/books/9781509307241

rules specific to, 139-140
summarizing next year's forecast (case study), 129-133
using DAX measures instead of calculated fields (case study), 141-145
calculated items, 359-361
changing solve order of, 147
creating, 133-137
defined, 121
rules for, 145-146
calculating groups, 361-362
calculation functions, 356-358
cell references and, 139
constants and, 139
DAX measures, 139
defined, 121
using DAX measures instead of calculated fields (case study), 141-145
deleting, 146-147
documenting, 148
editing, 146-147
grand total references, 139
managing, 257-258
multiple data fields, troubleshooting issues with, 355-356
named ranges and, 139
OLAP pivot tables, managing calculations, 257-258
operator precedence, 138
Show Values As tab (Value Field Settings dialog box), performing calculations with, 362-363
subtotal references, 139
totals, referencing, 139
VBA calculation options per Excel version, 364
worksheet functions and, 139
case studies
calculated fields, using DAX measures instead of, 141-145
converting live pivot tables to static values, 54-55
data sources, cleaning up, 15-19
grouping text fields for redistricting, 106-108
interactive reports showing revenue by product and time period (case study), creating, 157-161
life after pivot tables, xxvii-xxviii, xxix
life before pivot tables, xxiv-xxvi
market activity analysis, 35-36
store maps, using instead of globes, 299-302
summarizing next year's forecast, 129-133
transposing data sets with Power Query, 202-204
categorizing columns with Power Pivot, 287
cells
blank cells
deleting from pivot tables, 346-347
filling in data area, 336
filling in row area, 336
in data sources, 14
in numeric columns, 24
replacing with zeros, 47-48
calculations and cell references, 139
deleting cells, preventing errors, 336-337
empty cells, filling in row fields, 393-396
extracting from pivot tables based on pivot caches, 232
formatting in Office 365, 72
inserting cells, preventing errors, 336-337
changing
default pivot table behaviors for future pivot tables, 392
field names, 49
pivot table names, 33




www.itbook.store/books/9781509307241

previewing changes with Live Preview feature, 60
solve order of calculated items, 147
charts
bubble charts in 3D Map, 294
column charts in 3D Map, 292
column charts in 3D Map, 296
cross-filtering charts with Power BI Desktop, 218
pie charts in 3D Map, 294
pivot charts
alternatives to, 161-165
creating, 150-153
defined, 149
formatting limitations, 156
interactive reports showing revenue by product and time period (case study), 157-161
pivot field buttons, 152-153, 160
pivot tables and, 154-156, 162
x-axis, 155
XY scatter charts, 164-165
y-axis, 155
check boxes, filtering with, 88-89
Check Compatibility tool, 7-9
classic pivot table layout, 26-27
cleaning up data sources (case study), 15-19
clearing pivot table layouts, 40
Code window (Visual Basic Editor), 326
coding (object-oriented)
data ranges, 327-328
End+Down arrow versus End+Up arrow, 328
shortening code, 329
super-variables, 328-329
With and End With, 329
Collie, Rob, 143, 287, 425, 432
columns
% Of Parent Column option (Value Field Settings dialog box, Show Values As tab), 69
adding
columns to slicers, 100
columns with Power Query, 275-276
multiple subtotals to one field, 72
calculated columns, adding in Power Pivot grid, 281-282
categorizing columns with Power Pivot, 287
column charts in 3D Map, 292, 296
Column From Examples feature (Power Query), 275
empty columns in data sources, 14
filtering fields, 88
groups, repeating as columns, 13
headings, 11
hiding columns in Power Pivot, 287
labels
filtering with Values column information, 91-92
splitting between two rows, 12
manual sort sequences, 83-84
multiple subtotals, adding to one field, 72
numeric columns, blank cells in, 24
percentage change column for year-over-year reports, 417-419
Power Pivot
calculated columns, adding in Power Pivot grid, 281-282
categorizing columns with Power Pivot, 287
hiding columns in Power Pivot, 287
renaming columns with Power Pivot, 287
sorting one column by another with Power Pivot, 282




www.itbook.store/books/9781509307241

Power Query
adding columns with, 275-276
column-level actions, 198-200
removing columns with Power Query Editor, 191
splitting columns, 204-206
rearranging, 83-84
removing columns with Power Query Editor, 191
renaming columns with Power Pivot, 287
slicers, adding columns to, 100
sorting one column by another with Power Pivot, 282
splitting columns with Power Query, 204-206
subtotals (multiple), adding to one field, 72
Values columns, filtering Label columns, 91-92
widths
AutoFit, 59
vertically arranged pivot tables, 59
Columns area, 5, 22
Comments tool (VBA), 326
Compact layout, 51-53, 58, 75-76
comparing
line-to-line comparisons, Value field calculations, 66
tables with pivot tables, 400-401
compatibility
Check Compatibility tool, 7-9
pivot tables and Excel, 7-8
slicers, 7
timelines, 7
Timeline slicer, 35
conceptual filters in VBA, 374-377
conditional formatting of pivot tables
customizing rules, 168-172
example of conditional formatting, 165-167
preprogrammed scenarios, 167-168
constants and calculations, 139
converting
live pivot tables to static values (case study), 54-55
pivot tables
to cube formulas, 232-238
to values, 338-341
copying pivot tables to workbooks, 349-350
Count Distinct, 266-267, 357
Count of Revenue bug, 62
Create PivotTable dialog box, basic pivot table creation
choosing report location, 20
data selection, 20
PivotTable Fields list, 21-22
creating pivot tables
basic pivot table creation, 19
adding fields to reports, 22-24
adding fields to tables, 21-24
adding layers to reports, 25
choosing report location, 20
classic pivot table layout, 26-27
creating filters, 27
data selection, 20
dragging/dropping fields in reports and tables, 25-26
Ideas feature, 29-30
laying out reports, 22-24, 39-40
PivotTable Fields list, 21-22
rearranging tables, 25-26
Recommended PivotTables, 28-30
slicers, 31-35
from Data Model, 283
Pivot Power Premium add-in, 45
VBA and, 330-331
adding fields to data areas, 332-333
filling blank cells in data or row area, 336
formatting tables, 333-335




www.itbook.store/books/9781509307241

preventing errors from inserting/deleting cells, 336-337
totals, 337-338
cube formulas
CUBEMEMBER function, 234
CUBERANKEDMEMBER function, 236
CUBESET function, 235-238
CUBEVALUE function, 233-236
GETPIVOTDATA function versus, 232
pivot tables, converting to cube formulas, 232-238
SORTBY function, 238
cube functions, 248-250
CUBEMEMBER function, 234
CUBERANKEDMEMBER function, 236
cubes (OLAP)
connecting to, 239-242
dimensions of, 243
functions, 248-250
hierarchies of, 243, 257
levels of, 243
measures of, 243, 250-253
members of, 243, 250, 254-257
offline cubes, 245-247
PivotTable Fields list, 244
structure of, 242-243
CUBESET function, 235-238
CUBEVALUE function, 233-236
custom lists, sorting, 84-86, 286
custom maps (3D Map), 290
custom shapes (3D Map), 290
customers, sorting into high-to-low sequences based on revenue, 79-82
customizing
conditional formatting rules, 168-172
pivot tables, 44
blank cells, 47-48
blank rows, 50, 56-57
changing field names, 49
converting live pivot tables to static values (case study), 54-55
Count of Revenue bug, 62
default pivot tables, 44
formatting cells in Office 365, 72
grand totals, 50, 57-58
gridlines, 45
layouts, 50-53, 56-58, 75-76
subtotals, 50
number format, thousands separators, 46-47
Pivot Power Premium add-in, 45
previewing changes with Live Preview feature, 60
replacing blank cells with zeros, 47-48
settings, xxiv
styles, 45, 59-62
subtotals, 50, 70-72
Value field calculations, 63-70
sort lists, 390-391
Value field calculations, 63-65
% Difference From option (Value Field Settings dialog box, Show Values As tab), 68-69
% Of option (Value Field Settings dialog box, Show Values As tab), 66
% Of Parent Column option (Value Field Settings dialog box, Show Values As tab), 69
% Of Parent Row option (Value Field Settings dialog box, Show Values As tab), 69
% Of Parent Total option (Value Field Settings dialog box, Show Values As tab), 69




www.itbook.store/books/9781509307241

% Of Total option (Value Field Settings dialog box, Show Values As tab), 66
Index option (Value Field Settings dialog box, Show Values As tab), 69-70
line-to-line comparisons, 66
ranking options, 67
running total calculations, 67-68
visualizations with Power BI Desktop, 221-222

# D

Dalgleish, Debra, 45
data areas
blank cells, filling in data areas, 336
fields, adding to, 332-333
data cards (tooltips), 3D Map, 296
data items, sorting in a unique sort order, 389-390
Data Model, 330
32-bit Excel and, 287
adding
linked tables to Data Model, 279
model fields to pivot tables, 383
numeric fields to Values area, 384
tables to Data Model, 279, 381
creating, 176-179
cube formulas, converting pivot tables to, 232-238
DAX measures and median calculations, 269-271
Distinct Count, 266-267
Filtered Items in Totals, 269
limitations of, 180, 286-287
loading to Data Model instead of Excel grid, 277-278
median calculations with DAX measures, 269-271
pivot caches, 383
pivot tables
adding model fields to, 383
adding numeric fields to Values area, 384
converting to cube formulas, 232-238
creating, 283-386
Power Query data, outputting data to Data Model, 193
primary keys, 177
relationships
activating, 180
creating, 178-180
creating between tables, 382
deactivating, 180
deleting, 180
editing, 180
managing, 179
tables
adding linked tables to Data Model, 279
adding to Data Model, 180, 381
creating relationships, 382
defining relationships between tables, 279-280
text, reporting in Values area, 272
Values area, reporting text in, 272
VLOOKUP functions, replacing with Data Model, 261-266
data ranges
automatically expanding data ranges, creating, 399
writing code for, 327-328
data sets
combining in 3D Map, 297
exploding
to different tabs in pivot tables, 410-411
to different workbooks, 415-417
transposing with Power Query (case study), 202-204



www.itbook.store/books/9781509307241

data sources
blank cells in, 14
calculated fields, manually adding to data sources, 122-123
cleaning up (case study), 15-19
column headings, 11
disparate data sources
defined, 175
ETL processes, 188
external data, creating pivot tables, 181-187
external data, defined, 175
multiple ranges, defined, 175
Power Query and, 189-193, 202
empty columns in, 14
empty rows in, 14
gaps in, 14
good design techniques, 14
refreshing
changes made to existing data sources, 36
expanded data source ranges, 37
databases
OLAP databases, 239-240, 250-251
transactional databases, 239
date fields, grouping
by week, 110-111
including years when grouping by months, 110
manually grouping, 108-109
Date Filters, 94-96, 101, 375
date groups, xxiv
AutoGroup feature, 344
VBA and, 344-346
DAX formulas, 285
DAX functions, xxiv
DAX measures, 139
defined, 121
median calculations, 269-271
using DAX measures instead of calculated fields (case study), 141-145
Debugging tool (VBA), 326
default pivot tables
behaviors, changing for future pivot tables, 392
customizing, 44
deferring pivot table layout updates, 39-40
Delete key versus spaces, 24
deleting
calculations, 146-147
cells, preventing errors, 336-337
Data Model relationships, 180
pivot tables (underlying), pivot charts and, 162
source data worksheets, 398
dimensions of OLAP cubes, 243
disabling macros, 324
disparate data sources
defined, 175
ETL processes, 188
external data
creating pivot tables, 181-187
defined, 175
multiple ranges, defined, 175
Power Query and, 189-193, 202
Distinct Count, 266-267, 338
distributions (frequency), creating with pivot tables, 409-410
docking/undocking Fields list, 77
document themes, modifying styles with, 61-62
documenting
calculations, 148
formulas, 148



www.itbook.store/books/9781509307241

Doodads rule, Sort by, 82-83
dragging/dropping fields in reports, 25-26
drill-down methods, 286

# E

editing
  calculations, 146, 147
  Data Model relationships, 180
empty cells filling in row fields, 393
  Go To Special function (Excel), 395-396
  Repeat All Item Labels feature, 394-395
empty columns in data sources, 14
empty rows in data sources, 14
End+Down arrow versus End+Up arrow, coding, 328
End With and With, coding, 329
erasing pivot table layouts, 40
Escobar, Miguel, 287
ETL (Extraction, Transformation, Loading) processes, 188
"evil GetPivotData problem", 426-428
Excel
  32-bit Excel
    Data Model and, 287
    Power Pivot and, 287
  Go To Special function, filling empty cells in row fields, 395-396
  pivot tables, backward compatibility, 7, 8
  versions of, 330
Excel 2019
  Office 365 versus, xxix-xxx
  recommended pivot tables, xxvii
  ribbon, xxix-xxx
  system requirements, xxxii
*Excel 2019 In Depth*, 306
Excel grid, loading to Data Model instead, 277-278
Excel Help tool (VBA), 326
exploding data sets
  to different tabs, 410-411
  to workbooks, 415-417
external data
  defined, 175
  pivot tables, creating, 181
    from Access (MS) data, 181-184
    from SQL Server data, 184-187
extracting cells from pivot tables based on pivot caches, 232
extracts, creating, 3

# F

February 29 1900 and Power Pivot, 286-287
Field list, Areas section drop-downs, 78-79
fields
  adding to reports, 22-24
  calculated fields, 286, 358-359
    creating, 123-128
    defined, 121
    inserting into pivot tables, 124-125
    manually adding to data sources, 122-123
    rules specific to, 139-140
    summarizing next year's forecast (case study), 129-133
    using DAX measures instead of calculated fields (case study), 141-145
  changing names, 49
  collapsing/expanding in Compact layouts, 51
  column fields
    adding multiple subtotals to one field, 72
    filtering, 88



www.itbook.store/books/9781509307241

data areas, adding fields to, 332-333
date fields
grouping by week, 110-111
grouping manually, 108-109
including years when grouping by months, 110
dragging/dropping in reports, 25-26
expanding/collapsing in Compact layouts, 51
filter fields, 369-373. *See also* page fields (VBA)
Filters area, adding fields to, 96
formatting, 14
model fields, adding to pivot tables, 383
multiple data fields, troubleshooting issues with, 355-356
naming fields, 49
numeric fields
adding to Values area, 384
grouping, 104-105
rank number fields, adding to pivot tables, 396-398
page fields (VBA), 369-373. *See also* filter fields
pivot fields
manually filtering multiple items in, 373-374
restrictions, 413-415
PivotTable Fields list, 21-22
adding fields to tables, 24
dragging/dropping fields in tables, 25-26
primary keys, 177
rank number fields, adding to pivot tables, 396-398
row fields
adding multiple subtotals to one field, 72
filling empty cells, 393-396
filtering, 88
suppressing subtotals in, 348
turning subtotals on/off in, 70-71
text fields, grouping for redistricting (case study), 106-108
Value field, customizing calculations, 63-70
Fields list
docking/undocking, 77
rearranging, 77-78
filling
blank cells
in data area, 336
in row area, 336
empty cells in row fields, 393
Go To Special function (Excel), 395-396
Repeat All Item Labels feature, 394-395
FILTER function, 238
filters, 32. *See also* slicers
3D Map, 296
AutoFiltering pivot tables, 401-404
conceptual filters in VBA, 374-377
date filters in VBA, 375
Filtered Items in Totals, 269
filter fields, 369-373. *See also* page fields (VBA)
label filters in VBA, 374
pivot fields, manually filtering multiple items in, 373-374
pivot tables
AutoFiltering pivot tables, 401-404
check boxes, 88-89
column fields, 88
Date Filters, 94-96
dates, filtering by, 101
Filters area, 96-97
labels, 90-96
overview of, 86-87



www.itbook.store/books/9781509307241

replicating reports for each item in a filter, 97-98
row fields, 88
search box, 89-90
slicers, 99-104, 378-380
Timeline slicers, 101-104
Top 10 filter, 93-94
Values columns, filtering Label columns, 91-92
recordsets, filtering with ShowDetail (VBA), 367-373
search filter in VBA, 377, 378
Top 10 filter, 268
value filters in VBA, 375
Filters area, 6, 22
adding fields to, 96
choosing
multiple items from a filter, 97
one item from a filter, 96
creating filters, 27
flat maps in 3D Map, 295, 296
fonts and themes, 62
forecasts, summarizing next year's forecast (case study), 129-133
form controls
ActiveX controls versus, 307
defined, 306
macros, assigning to form controls, 308
scrollbars, adding to spreadsheets, 309-312
user interfaces, creating, 306-308
viewing, 307
formatting
cells in Office 365, 72
conditional formatting and pivot tables
customizing rules, 168-172
example of conditional formatting, 165-167
preprogrammed scenarios, 167-168
fields, 14
individual values in pivot tables, 405-407
numbers
multiple number formats in pivot tables, 404-405
thousands separators, 46-47
pivot charts, 156
pivot tables, 333-335, 350
sections of pivot tables, 407-408
slicers, 100-101
formulas
arrow keys in formula creation, 286
calculated fields, creating with formulas outside a pivot table, 123-124
documenting, 148
GetPivotData, preventing, 429
List Formulas command, 148
frequency distributions, creating with pivot tables, 409-410
functions (OLAP cube), 248-250


# G


Gainer, Dave, 425
geocoding data in 3D Map, 290-291
GeoFlow. *See* 3D Map
GetPivotData, 425
default status, determining reasons for its, 430-431
pivot table annoyances, solving, 431
creating shell reports, 435-436
creating ugly pivot tables, 432-435
populating shell reports, 437-440
updating shell reports, 441-442




www.itbook.store/books/9781509307241

preventing
by turning off GetPivotData, 429-430
by typing the formula, 429
problems with, 426-428
GETPIVOTDATA function
cube formulas versus, 232
extracting cells from pivot tables based on pivot caches, 232
Get & Transform tools, cleaning up data sources (case studies), 15-19
globes, using store maps instead of (case study), 299-302
Go To Special function (Excel), empty cells, filling in row fields, 395-396
grand totals
calculations, grand total references, 139
controlling with VBA, 337-338
layouts, 50, 57-58
gridlines, restoring to pivot tables, 45
grouping
auto date-grouping, 75
AutoGroup
determining AutoGroup criteria, 111
using, 112
year-over-year reports, 113-115
calculating groups, 361-362
date fields
by week, 110-111
including years when grouping by months, 110
manually grouping, 108-109
date grouping, xxiv
numeric fields, 104-105
pivot tables, 286
repeating as columns, 13
text fields for redistricting (case study), 106-108


# H


hard data, turning pivot tables into, 393
headings
column headings, 11
section headings, storing data in, 12
heat maps in 3D Map, 294
help
Excel Help tool (VBA), 326
support/feedback, xxxii
hiding
columns with Power Pivot, 287
legends in 3D Map, 296
panes in 3D Map, 296
hierarchies, 116-118
drill-down hierarchies, 219-220
OLAP cubes, 243, 257
Power Pivot and, 287
high-to-low sequences, sorting customers in based on revenue, 79-82
Hoter, Dany, 238


# I


Ideas feature, 29-30
images in Power BI Desktop, 212
importing
custom visualizations, Power BI Desktop, 221-222
data to Power BI Desktop, 208
Index option (Value Field Settings dialog box, Show Values As tab), 69-70
individual values, formatting in pivot tables, 405-407
Insert Slicers dialog box, 31-32
Insights command (Office 365), xxiv
Insights feature and Power BI Desktop, 224




www.itbook.store/books/9781509307241

interactive reports
Power BI Desktop, creating reports with
cross-filtering charts, 218
drill-down hierarchies, 219-220
mobile phones, designing reports for, 223
publishing to Power BI Desktop, 222
visualizations, 213-217, 221-224
showing revenue by product and time period (case study), 157-161
interactive web pages, workbooks as, 226-229
item labels, repeating, 52

# J–K

Javelin, xxvi
Jelen, Bill, 306

# L

Label columns, filtering with Values column information, 91-92
Label Filters option, filtering with, 90-91
labeling
column labels, splitting between two rows, 12
data points in 3D Map, 294
Date Filters, 94-96
filtering, 90-91
label filters in VBA, 374
maps in 3D Map, 295
Repeat All Item Labels, 330, 394-395
repeating item labels, 52
row labels, turning on/off in Compact layout, 58
large data files, processing with Power Query, 273-275
latitude (3D Map), 290
layers, adding to reports, 25
layouts, 22-24
blank rows, 50, 56-57
classic pivot table layout, 26-27
Compact layout, 51-53, 58, 75-76
deferring layout updates, 39-40
grand totals, 50, 57-58
Outline layout, 52-53
subtotals, 50
Tabular layout, 12-14, 53, 75-76, 344
vertically arranging pivot tables, 59
legends (3D Map), 296
life after pivot tables (case study), xxvii-xxix
life before pivot tables (case study), xxiv-xxvi
line-to-line comparisons, Value field calculations, 66
linked tables, adding to Data Model, 279
links, sharing to workbooks, 229
List Formulas command, 148
lists (custom), sorting, 84-86, 286
live pivot tables, converting to static values (case study), 54-55
Live Preview feature, 60
loading to Data Model instead of Excel grid, 277-278
longitude (3D Map), 290
Lotus, xxvi
Lotus Improv, xxvi

# M

*M is for Data Monkey*, 195, 287
M language
applied steps (Power Query), 194-195
viewing, 276
Macro Recorder versus Power Query, 277



www.itbook.store/books/9781509307241

macros, 330
benefits of, 303
creating
Power Query, 313-321
VBA Macro Controller, 310-312
defined, 303
disabling, 324
enabling, 323-325
form controls, assigning macros to, 308
functionality, adding to recorded macros, 308-309
macro recorder, 326-328
pivot table reports and, 303
recording, 304-305, 308-309
scrollbars, adding to spreadsheets, 309-312
security, 305-306
VBA Macro Controller, 310-312
managing
calculations, OLAP pivot tables, 257-258
Data Model relationships, 179
queries in Power Query, 196-198
manual sort sequences, 82, 83, 84
manually
adding calculated fields to data sources, 122-123
grouping date fields, 108-109
maps (3D), 289
aerial photography maps, 295
animating data over time, 297-298
annotation (text boxes), 294, 299
bubble charts, 294
column charts, 292, 296
combining data sets, 297
custom maps, 290
custom shapes, 290
data cards (tooltips), 296
filters, 296
flat maps, 295-296
geocoding data, 290-291
heat maps, 294
hiding
legends, 296
panes, 296
labeling
data points, 294
maps, 295
latitude, 290
legends
hiding, 296
resizing, 296
longitude, 290
navigating maps, 292-293
pie charts, 294
preparing data for, 289
region maps, 294
relationships (table), 290
resizing legends, 296
store maps, using instead of globes (case study), 299-302
table relationships, 290
timelines, 298
tours, creating, 298-299
vantage point, moving, 293
video, creating, 299
zooming in/out of maps, 293
market activity analysis (case study), 35-36
McDaid, Joe, 238
MDX (Multidimensional Expressions), 250
calculated measures, 251-253
calculated members, 254-257
*MDX Solutions*, 251
measures (DAX), 139
defined, 121
median calculations, 269-271



www.itbook.store/books/9781509307241

OLAP cubes, 243, 250-253
Power Pivot, 384. *See also* calculations
using DAX measures instead of calculated fields (case study), 141-145
median calculations with DAX measures, 269-271
members of OLAP cubes, 243, 250, 254-257
Merge queries, 421
mobile phones, designing interactive reports for, 223
model fields, adding to pivot tables, 383
modifying styles with document themes, 61-62
months, grouping by, 110
mouse, manual sort sequences, 83-84
Movie PivotTable dialog box, 41
multiple data fields, troubleshooting issues with, 355-356
multiple number formats in pivot tables, 404-405
multiple ranges, defined, 175


# N


named ranges and calculations, 139
named sets, 330
naming
fields, 49
pivot tables, 33
natural language queries and Power BI Desktop, 213
navigating maps in 3D Map, 292-293
next year's forecast (case study), summarizing, 129-133
number fields (rank), adding to pivot tables, 396-398
number formats
changing in pivot tables, 347-348
multiple formats in pivot tables, 404-405
thousands separators, 46-47
numeric columns in blank cells, 24
numeric fields
adding to Values area, 384
grouping, 104-105


# O


object-oriented coding
data ranges, 327-328
End+Down arrow versus End+Up arrow, 328
shortening code, 329
super-variables, 328-329
With and End With, 329
Office 365
costs of, xxxi
Excel 2019 versus, xxix-xxx
formatting cells, 72
Insights command, xxiv
new features of, xxx-xxxi
ribbon, xxx
offline cubes, creating, 245-247
OLAP (Online Analytical Processing)
cubes
connecting to, 239-242
dimensions of, 243
functions, 248-250
hierarchies of, 243, 257
levels of, 243
measures of, 243, 250-253
members of, 243, 250, 254-257
offline cubes, creating, 245-247
PivotTable Fields list, 244
structure of, 242-243
databases, 239-240, 250-251
pivot tables
adding calculations to, 250
limitations of, 244-245




www.itbook.store/books/9781509307241

managing calculations, 257-258
MDX and, 250-251
what-if analysis of OLAP data, 258-259
OneDrive workbooks, sharing links to, 229
operator precedence and calculations, 138
Outline layout, 52-53

# P

page breaks, subtotals as, 350-351
page fields (VBA), 369-373. *See also* filter fields
percentage change column for year-over-year reports, 417-419
pictures of pivot charts, distributing, 163
pie charts in 3D Map, 294
pivot caches, 7, 398
cells, extracting from pivot tables based on pivot caches, 232
Data Model tables and, 383
defining, 383
refreshing, 6
changes made to existing data sources, 36
expanded data source ranges, 37
sharing, 37-39
pivot charts
alternatives to, 161
deleting underlying pivot tables, 162
distributing pictures of pivot charts, 163
pivot table-linked cells as pivot chart source data, 163-165
turning pivot tables into hard values, 162
creating, 150-153
defined, 149
formatting limitations, 156
interactive reports showing revenue by product and time period (case study), 157-161
pivot field buttons, 152-153, 160
pivot tables and
effects of changes in pivot tables on pivot charts, 154
placement of data fields in pivot tables on pivot charts, 154-156
x-axis, 155
XY scatter charts, 164-165
y-axis, 155
pivot field buttons (pivot charts), 152-153, 160
pivot fields
manually filtering multiple items in, 373-374
restrictions, 413-415
Pivot Power Premium add-in, 45
PivotTable Fields list, 21-22
fields
adding to tables, 24
dragging/dropping in tables, 25-26
OLAP cubes, 244
pivot table reports, 1
column headings, 11
layouts, 22-24
classic layout, 26-27
deferring layout updates, 39-40
starting over, 40
location of, choosing, 20
macros, 303
pivot caches, 6-7
refreshing
changes made to existing data sources, 36
expanded data source ranges, 37
size of, reducing, 398
snapshots, 6



www.itbook.store/books/9781509307241

pivot tables, 1
anatomy of
Columns area, 5
Filters area, 6
Rows area, 5
Values area, 4
annoyances, solving with GetPivotData, 431-432
creating shell reports, 435,-436
creating ugly pivot tables, 432-435
populating shell reports, 437-440
updating shell reports, 441-442
basic creation, 19
adding fields to reports, 22-24
adding layers to reports, 25
choosing report location, 20
classic pivot table layout, 26-27
creating filters, 27
data selection, 20
dragging/dropping fields in reports, 25-26
Ideas feature, 29-30
laying out reports, 22-24, 39-40
PivotTable Fields list, 21-26
rearranging tables, 25-26
Recommended PivotTables, 28-30
slicers, 31-35
blank cells, deleting, 346-347
calculated data fields, 358-359
calculated items, 359-361
calculating groups, 361-362
calculating with, 355
Show Values As tab (Value Field Settings dialog box), 362-363
VBA calculation options per Excel version, 364
calculation functions, 356-358
cells
blank cells, deleting, 346-347
extracting from pivot tables based on pivot caches, 232
Columns area, 5, 22
comparing tables with, 400-401
conditional formatting
customizing rules, 168-172
example of, 165-167
preprogrammed scenarios, 167-168
converting live tables to static values (case study), 54-55
copying as values to workbooks, 349-350
creating. *See also* basic pivot table creation
from Data Model, 283
Pivot Power Premium add-in, 45
VBA and, 330-338
cube formulas, converting pivot tables to, 232-238
custom lists, sorting, 286
customizing, 44
blank cells, 47-48
blank rows, 50, 56-57
changing field names, 49
converting live pivot tables to static values (case study), 54-55
Count of Revenue bug, 62
default pivot tables, 44
formatting cells in Office 365, 72
grand totals, 50, 57-58
gridlines, 45
layouts, 50-53, 56-58, 75-76
subtotals, 50
number format, thousands separators, 46-47
Pivot Power Premium add-in, 45



www.itbook.store/books/9781509307241

previewing changes with Live Preview feature, 60
replacing blank cells with zeros, 47-48
settings, xxiv
styles, 45, 59-62
subtotals, 50, 70-72
Value field calculations, 63-70
Data Model
adding model fields to, 383
adding numeric fields to Values area, 384
creating pivot tables, 283, 383-386
data sets, exploding
to different tabs, 410-411
to different workbooks, 415-417
date groups and VBA, 344-346
default behaviors, changing for future pivot tables, 392
default settings, xxiv
development of, xxvi
distributions (frequency), creating, 409-410
Excel backward compatibility, 7, 8
extracts, creating, 3
filters
AutoFiltering pivot tables, 401-404
creating, 27
Filters area, 6, 22, 27
formatting, 333-335
individual values in pivot tables, 405-407
multiple number formats in pivot tables, 404-405
sections of pivot tables, 407-408
VBA and, 350
frequency distributions, creating, 409-410
GetPivotData, solving annoyances with, 431-432
creating shell reports, 435-436
creating ugly pivot tables, 432-435
populating shell reports, 437-440
updating shell reports, 441-442
grouping, 286
hard data, turning pivot tables into, 393
Ideas feature, 29-30
life after (case study), xxvii-xxix
life before (case study), xxiv-xxvi
live tables, converting to static values (case study), 54-55
limitations of, 7
Move PivotTable dialog box, 41
multiple data fields, troubleshooting issues with, 355-356
naming, 33
new features, xxiii-xxiv
number fields (rank), adding to pivot tables, 396-398
number format
changing, 347-348
multiple number formats in, 404-405
OLAP pivot tables
adding calculations to, 250
limitations of, 244-245
managing calculations, 257-258
MDX and, 250-251
what-if analysis of OLAP data, 258-259
page breaks, subtotals as, 350-351
product calculations, 286
rank number fields, adding to pivot tables, 396-398
rearranging, 25-26
Recommended PivotTables, xxvii, 28-30
refreshing, 431



www.itbook.store/books/9781509307241

all pivot tables in a workbook at the same time, 388
automatically refreshing, 388
relocating, 41
restrictions, 412-413
Rows area, 5, 22
slicers
connecting to multiple pivot tables, 32-33
standard slicers, 31-33
Timeline slicer, 34-35
sort order, controlling with AutoSort, 347
sorting
custom lists, 390-391
unique sort order, 389-390
static values (case study), converting live tables to, 54-55
subtotals
as page breaks, 350-351
suppressing for multiple row fields, 348
Tabular layouts and VBA, 344
ugly pivot tables, creating, 432-435
updates, xxxii
usage examples, 2, 3
Values area, 4, 22
VBA
AutoShow and executive overviews, 365-367
calculating with pivot tables, 355-364
changing default number format, 347-348
conceptual filters, 374-377
controlling sort order with AutoSort, 347
converting to values, 338-341
copying as values to workbooks, 349-350
creating pivot tables, 330-338
creating reports for each region/model, 369-373
creating revenue by category reports, 341-344
date filters, 375
date groups, 344-346
deleting blank cells, 346-347
filtering recordsets with ShowDetail, 367-373
formatting pivot tables, 350
label filters, 374
manually filtering multiple items in pivot fields, 373-374
search filter, 377-378
slicers, filtering pivot tables, 378-380
subtotals as page breaks, 350-351
summary reports, producing, 352-354
suppressing subtotals for multiple row fields, 348
Tabular layouts, 344
value filters, 375
versions of, 330
workbooks, copying pivot tables to, 349-350
Power BI Custom Visuals, 173-174
Power BI Desktop, xxiv, 207
cross-filtering charts, 218
drill-down hierarchies, 219-220
Excel, preparing data in, 208
images in, 212
importing data to, 208
Insights feature, 224
interactive reports, creating
creating visualizations, 213-217
cross-filtering charts, 218
designing reports for mobile phones, 223
drill-down hierarchies, 219-220




www.itbook.store/books/9781509307241

importing custom visualizations, 221-222
publishing to Power BI Desktop, 222
publishing to workspaces, 223-224
natural language queries, 213
navigating, 209-210
preparing data in, 210-212
publishing to, 222
Q&A feature, 225-226
querying data, 225-226
relationships, 210-213
setting up, 207
signing in, 207
synonyms, defining, 213
visualizations, 209
creating, 213-217
importing custom visualizations, 221-222
workspaces, publishing to, 223-224
Power Map. *See* 3D Map
Power Pivot, xxiv, 261
32-bit Excel and, 287
benefits of, 287
columns
calculated columns, adding in Power Pivot grid, 281-282
categorizing, 287
hiding, 287
renaming, 287
sorting one column by another, 282
Data Model
adding model fields to pivot tables, 383
adding numeric fields to Values area, 384
adding tables to, 381
creating pivot tables, 383-386
creating relationships between tables, 382
defining pivot caches, 383
February 29 1900, 286-287
hierarchies, 116-118, 287
limitations of, 286-287
measures, 384. *See also* calculations
pivot tables, creating from Data Model, 283
relationships, 284
time intelligence, 285
using DAX measures instead of calculated fields (case study), 143
*Power Pivot and Power BI*, 287
Power Pivot Data Model, 330
*Power Pivot for the Data Analyst*, 282
Power Query
Advanced Query Editor, 195
applied steps, 194-195, 276
big data files, processing, 273-275
cleaning up data sources (case studies), 15-19
columns
adding, 275-276
Column From Examples feature, 275
column-level actions, 198-200
removing, 191
splitting, 204-206
connection types, 202
ETL processes, 188
installing, 188
M language
applied steps, 194-195
viewing, 276
macros, creating, 313-321
managing queries, 196-198
outputting data to Data Model, 193
Power Query Editor, cleaning up data sources (case studies), 16




www.itbook.store/books/9781509307241

previewing data, 190
queries
managing, 196-198
starting, 188-190
refreshing data, 196
removing columns, 191
splitting
columns, 204-206
rows, 204-206
table actions, 200-201
transforming data, 190-192
transposing data sets (case study), 202-204
two-way VLOOKUP, 419-424
VBA Macro Recorder versus, 277
Power View, xxiv
previewing changes with Live Preview feature, 60
primary keys, 177
product calculations, 286
Project Explorer (Visual Basic Editor), 325
properties (VBA coding), 327
Properties window (Visual Basic Editor), 326
publishing
interactive reports to workspaces, 223-224
to Power BI Desktop, 222
Puls, Ken, 195, 287

# Q

Q&A feature and Power BI Desktop, 225-226
queries
managing queries with Power Query, 196-198
Merge queries, 421
natural language queries, 213
Power BI Desktop
natural language queries, 213
querying data with Q&A feature, 225-226
starting queries with Power Query, 188-190
web queries (Power Query)
Advanced Query Editor, 195
applied steps, 194-195
column-level actions, 198-200
connection types, 202
ETL processes, 188
installing, 188
managing queries, 196-198
outputting data to Data Model, 193
previewing data, 190
refreshing data, 196
removing columns, 191
splitting columns/rows, 204-206
starting queries, 188-190
table actions, 200-201
transforming data, 190-192
transposing data sets (case study), 202-204

# R

ranges
multiple ranges, defined, 175
named ranges and calculations, 139
rank number fields, adding to pivot tables, 396-398
ranking, Value field calculations, 67
rearranging
columns, 83-84
Fields list, 77-78
pivot tables, 25, 26
Recommended PivotTables, xxvii, 28-30
redistricting, grouping text fields for (case study), 106-108



www.itbook.store/books/9781509307241

references and calculations
cell references, 139
totals, 139
refreshing
data in Power Query, 196
data sources
changes made to existing data sources, 36
expanded data source ranges, 37
pivot caches, 6
changes made to existing data sources, 36
expanded data source ranges, 37
pivot table reports
changes made to existing data sources, 36
expanded data source ranges, 37
pivot tables, 431
all pivot tables in a workbook at the same time, 388
automatically refreshing, 388
slow refreshes, 286
region maps in 3D Map, 294
relationships
3D Map table relationships, 290
Data Model
activating relationships, 180
creating relationships, 178-180
deactivating relationships, 180
deleting relationships, 180
editing relationships, 180
managing relationships, 179
tables, 279-280, 382
Power BI Desktop, 210-213
Power Pivot and, 284
tables, defining relationships between tables with Data Model, 279-280
relocating pivot tables, 41
removing columns with Power Query Editor, 191
renaming columns with Power Pivot, 287
re-ordering items, 286
Repeat All Item Labels, 330, 394-395
repeating
groups as columns, 13
item labels, 52
replicating reports for each item in a filter, 97-98
report layouts, 50
blank rows, 50, 56, 57
Compact layout, 51, 53, 75, 76
turning row labels on/off, 58
grand totals, 50, 57, 58
Outline layout, 52, 53
subtotals, 50
Tabular layout, 53, 75, 76
reports
filters, replicating reports for each item in a, 97-98
interactive reports, creating with Power BI Desktop
creating visualizations, 213, 214, 215, 217
cross-filtering charts, 218
designing reports for mobile phones, 223
drill-down hierarchies, 219, 220
importing custom visualizations, 221, 222
publishing to Power BI Desktop, 222
publishing to workspaces, 223, 224
layouts
blank rows, 50, 56-57
Compact layout, 51-53, 58, 75-76
grand totals, 50, 57-58
Outline layout, 52-53
subtotals, 50
Tabular layout, 53, 75-76



www.itbook.store/books/9781509307241

macros, 303
replicating reports for each item in a filter, 97-98
revenue by category reports, creating, 341-344
shell reports
creating, 435-436
populating, 437-440
updating, 441-442
size of, reducing, 398
summary reports, producing, 352-354
Top 5 Markets reports, 365-367
top-five reports, creating with Top 10 filter, 93-94
VBA, creating reports for each region/model, 369-373
year-over-year reports
creating, 113-115
percentage change column and, 417-419
requirements (system), xxxii
resizing legends (3D Map), 296
restrictions
pivot fields, 413-415
pivot tables, 412-413
revenue
interactive reports showing revenue by product and time period (case study), creating, 157-161
revenue by category reports, creating, 341-344
sorting customers into high-to-low sequences based on revenue, 79-82
ribbon
Excel 2019, xxix-xxx
Office 365, xxx
rows
% Of Parent Row option (Value Field Settings dialog box, Show Values As tab), 69
blank cells, filling in row area, 336
blank rows (layouts), 50, 56-57
column labels, splitting between two rows, 12
empty cells, filling, 393
Go To Special function, 395-396
Repeat All Item Labels feature, 394-395
empty rows in data sources, 14
filtering fields, 88
labels, turning on/off in Compact layout, 58
multiple row fields, suppressing subtotals in, 348
splitting with Power Query, 204-206
subtotals
adding multiple subtotals to one field, 72
suppressing for multiple row fields, 348
turning on/off in row fields, 70,-71
Rows area, 5, 22
running total calculations, Value field calculations, 67-68


# S


Salas, Pito, xxvi
scatter charts, 164-165
scrollbars, adding to spreadsheets, 309-312
search box, filtering with, 89-90
search filter in VBA, 377-378
section headings, storing data in, 12
security
macros, 305-306
trusted locations, 306
shapes (custom) in 3D Map, 290
sharing
links to workbooks, 229
pivot caches, 37-39




www.itbook.store/books/9781509307241

shell reports
creating, 435-436
populating, 437-440
updating, 441-442
ShowDetail (VBA), filtering recordsets, 367-369
ShowPages (VBA), 370
Show Values As tab (Value Field Settings dialog box), 65
% Difference From option, 68-69
% Of option, 66
% Of Parent Column option, 69
% Of Parent Row option, 69
% Of Parent Total option, 69
% Of Total option, 66
Index option, 69-70
performing calculations with, 362-363
ranking options, 67
running total calculations, 67-68
size of pivot table reports, reducing, 398
slicers, 330. *See also* filters
columns, adding to slicers, 100
compatibility, 7
filtering with, 99-101, 378-380
formatting, 100-101
Insert Slicers dialog box, 31-32
multiple pivot tables
connecting to, 32-33
driving from, 102-104
slicing the measures, 243
standard slicers, creating, 31-33
Timeline slicers, 101
compatibility, 35
creating, 34-35
driving multiple tables from, 102-104
interactive reports showing revenue by product and time period (case study), creating, 158-159
snapshots
pivot caches, refreshing, 6
pivot table reports, 6
solve order of calculated items, changing, 147
Sort by Doodads rule, 82-83
SORTBY function, 238
sorting
custom lists, 286
data items, unique sort order, 389-390
one column by another with Power Pivot, 282
pivot tables
custom lists, 84-86, 390-391
manual sort sequences, 82-84
Sort by Doodads rule, 82-83
sorting customers into high-to-low sequences based on revenue, 79-82
unique sort order, 389-390
sort order, controlling with AutoSort, 347
source data worksheets, deleting, 398
spaces
as text, 24
Delete key versus, 24
splitting
columns
labels between two rows, 12
columns with Power Query, 204-206
rows with Power Query, 204-206
Spofford, George, 251
spreadsheets, adding scrollbars to, 309-312
SQL Server, creating pivot tables from SQL Server data, 184-187
standard slicers, creating, 31-33
starting over, pivot table layouts, 40
static values, converting live pivot tables to (case study), 54-55
store maps, using instead of a globe (case study), 299-302



www.itbook.store/books/9781509307241

storing data in section headings, 12
styles
creating, 60
customizing, 60
modifying with document themes, 61-62
pivot table styles, 59
applying, 45
creating styles, 60
customizing styles, 60
modifying with document themes, 61-62
subtotals, 50
calculations, subtotal references, 139
controlling with VBA, 337-338
multiple subtotals, adding to one field, 72
page breaks, 350-0351
row fields, turning subtotals on/off in, 70-71
Sum, Count of Revenue bug, 62
SUMIFS function, xxv-xxviii
summarizing next year's forecast (case study), 129-133
summary reports, producing, 352-354
SUMPRODUCT function. *See* SUMIFS function
*Supercharge Excel*, 287
super-variables, coding, 328-329
support/feedback, xxxii
synonyms, defining in Power BI Desktop, 213
system requirements, xxxii

# T

tables
adding to Data Model, 180
Data Model
adding tables to, 180
defining relationships, 279-280
linked tables in, 279
pivot tables, comparing with, 400-401
Power Query, table actions, 200-201
relationships
3D Map relationships, 290
defining with Data Model, 279-280
styles, applying, 45
Tabular layout, 12-14, 53, 75-76, 344
text
spaces as, 24
Values area, reporting text in, 272
text boxes (annotation) in 3D Map, 294, 299
text fields, grouping for redistricting (case study), 106-108
themes
document themes, modifying styles with, 61-62
fonts, 62
thousands separators (number format), 46-47
time intelligence (Power Pivot), 285
Timeline slicers, 101
compatibility, 35
creating, 34-35
driving multiple tables from, 102-104
interactive reports showing revenue by product and time period (case study), creating, 158-159
timelines
3D Map tours, 298
compatibility, 7
tooltips (data cards) in 3D Maps, 296
Top 5 Markets reports, 93-94, 365-367
Top 10 filter, 93-94, 268
totals
calculations, referencing in, 139
Filtered Items in Totals, 269
pivot tables, controlling totals, 337-338
tours (3D Map), creating, 298-299



www.itbook.store/books/9781509307241

transactional databases, 239
transposing data sets with Power Query (case study), 202-204
Trust Center, enabling macros, 323-324
trusted locations, 306
turning on/off
GetPivotData, 429-430
row labels in Compact layout, 58
subtotals in row fields, 70-71
two-way VLOOKUP, 419-424

# U

ugly pivot tables, creating, 432-435
undocking/docking Fields list, 77
unique sort orders, 389-390
updates, xxxii
pivot caches
changes made to existing data sources, 36
expanded data source ranges, 37
pivot table updates, deferring, 39-40
shell reports, 441-442
slow refreshes, 286
user interfaces
creating with form controls, 306-308
defined, 306

# V

Value field, customizing calculations, 63-65
% Difference From option (Value Field Settings dialog box, Show Values As tab), 68-69
% Of option (Value Field Settings dialog box, Show Values As tab), 66
% Of Parent Column option (Value Field Settings dialog box, Show Values As tab), 69
% Of Parent Row option (Value Field Settings dialog box, Show Values As tab), 69
% Of Parent Total option (Value Field Settings dialog box, Show Values As tab), 69
% Of Total option (Value Field Settings dialog box, Show Values As tab), 66
Index option (Value Field Settings dialog box, Show Values As tab), 69-70
line-to-line comparisons, 66
performing calculations with, 362-363
ranking options, 67
running total calculations, 67-68
values
filters in VBA, 375
pivot tables, converting to, 54-55, 338-341
Values area, 4, 22
fields, changing names, 49
text, reporting in, 272
Values columns, filtering Label columns, 91-92
vantage point (3D Map), moving, 293
VBA (Visual Basic for Applications)
AutoComplete tool, 326
AutoShow, executive overviews of pivot tables, 365-367
coding, properties, 327
Comments tool, 326
conceptual filters, 374-377
date filters, 375
Debugging tool, 326
enabling, 323-324
Excel Help tool, 326
label filters, 374



www.itbook.store/books/9781509307241

Macro Controller
macros, creating, 310-312
scrollbars, adding to spreadsheets, 310-312
Macro Recorder versus Power Query, 277
object-oriented coding
data ranges, 327-328
End+Down arrow versus End+Up arrow, 328
shortening code, 329
super-variables, 328-329
With and End With, 329
page fields, 369-373. *See also* filter fields
pivot fields, manually filtering multiple items in, 373-374
pivot tables
changing default number format, 347-348
converting to values, 338-341
copying as values to workbooks, 349-350
date groups, 344-346
deleting blank cells, 346-347
formatting, 350
producing summary reports, 352-354
sort order, controlling with AutoSort, 347
revenue by category reports, 341-344
subtotals as page breaks, 350-351
subtotals, suppressing for multiple row fields, 348
Tabular layouts, 344
pivot tables, advanced techniques
AutoShow and executive overviews, 365-367
conceptual filters, 374-377
creating reports for each region/model, 369-373
date filters, 375
filtering recordsets with ShowDetail, 367-373
label filters, 374
manually filtering multiple items in pivot fields, 373-374
search filter, 377-378
slicers, filtering pivot tables, 378-380
value filters, 375
pivot tables, calculating with
calculated data fields, 358-359
calculated items, 359-361
calculating groups, 361-362
calculation functions, 356-358
Show Values As tab (Value Field Settings dialog box), 362-363
troubleshooting issues with multiple data fields, 355-356
VBA calculation options per Excel version, 364
pivot tables, creating, 330-331
adding fields to data areas, 332-333
filling blank cells in data or row area, 336
formatting tables, 333-335
preventing errors from inserting/deleting cells, 336-337
totals, 337-338
reports, creating for each region/model, 369-373
search filter, 377-378
ShowDetail, filtering recordsets, 367-369
ShowPages, 370
slicers, filtering pivot tables, 378-380
summary reports, producing, 352-354
value filters, 375



www.itbook.store/books/9781509307241

Visual Basic Editor
Code window, 326
Project Explorer, 325
Properties window, 326
vertically arranging pivot tables, 59
video, creating with 3D Map, 299
Visual Basic Editor
Code window, 326
Project Explorer, 325
Properties window, 326
visualizations
customizing with Power BI Desktop, 221-222
pivot charts
alternatives to, 161-165
creating, 150-153
creating interactive reports showing revenue by product and time period (case study), 157-161
defined, 149
effects of changes in pivot tables on pivot charts, 154
formatting limitations, 156
pivot field buttons, 152-153, 160
placement of data fields in pivot tables on pivot charts, 154-156
x-axis, 155
XY scatter charts, 164-165
y-axis, 155
Power BI Custom Visuals, 173-174
Power BI Desktop, 209
creating visualizations, 213-217
importing custom visualizations, 221-222
VLOOKUP, 206
Data Model, replacing with, 261-266
two-way VLOOKUP, 419-424


# W


web pages (interactive),workbooks as, 226-229
web queries (Power Query)
Advanced Query Editor, 195
applied steps, 194-195
column-level actions, 198-200
connection types, 202
ETL processes, 188
installing, 188
managing queries, 196-198
outputting data to Data Model, 193
previewing data, 190
refreshing data, 196
removing columns, 191
splitting columns/rows, 204-206
starting queries, 188-190
table actions, 200-201
transforming data, 190-192
transposing data sets (case study), 202-204
weeks, grouping date fields by, 110-111
what-if analysis, OLAP pivot table data, 258-259
widths (columns)
AutoFit, 59
vertically arranged pivot tables, 59
With and End With, coding, 329
workbooks
data sets, exploding to different workbooks, 415-417
interactive web pages, workbooks as, 226-229
macros, enabling, 325
pivot tables
copying pivot tables to, 349-350
refreshing all pivot tables at the same time, 388
sharing links to, 229




www.itbook.store/books/9781509307241

worksheets
functions and calculations, 139
source data worksheets, deleting, 398
workspaces, publishing interactive reports to, 223-224

# X

x-axis (pivot charts), 155
.xls file format, enabling macros, 325
.xlsb file format, enabling macros, 325
.xlsm file format, enabling macros, 325
XY scatter charts, 164-165

# Y

y-axis (pivot charts), 155
year-over-year reports
creating, 113-115
percentage change column and, 417-419
years
including when grouping by months, 110
summarizing next year's forecast (case study), 129-133

# Z

zeros, replacing blank cells with, 47-48
zooming in/out of maps in 3D Map, 293



www.itbook.store/books/9781509307241