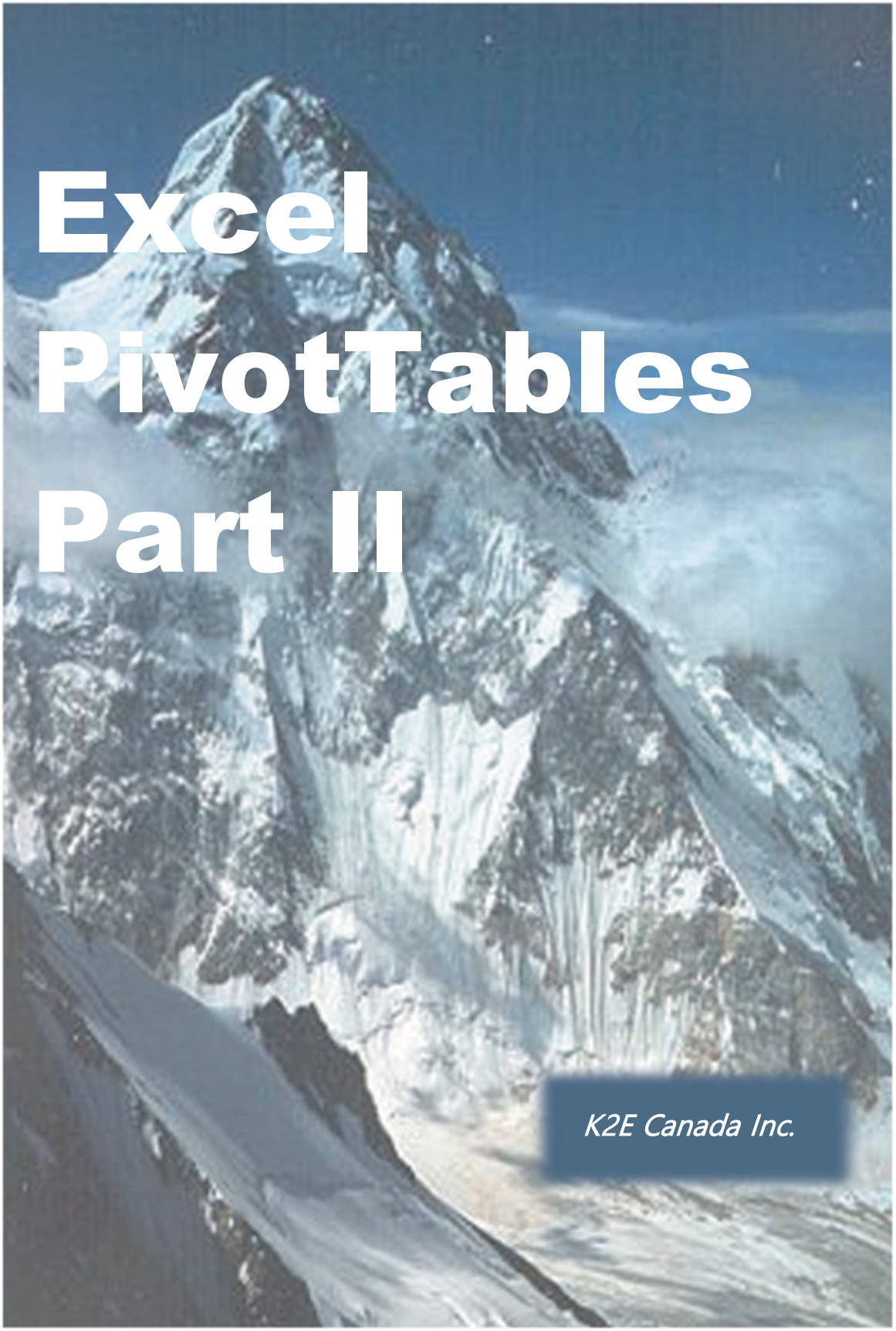

Excel PivotTables Part II

K2E Canada Inc.

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Chapter

1

PivotTables Review

PivotTables are the most powerful feature of Excel, yet few accountants use them in their day-to-day activities. Even those who use PivotTables on a daily basis sometimes become frustrated by the complexity and sophistication of this functionality. Our coverage begins with a quick review of the foundational material in the K2E Canada Inc. *Excel PivotTables – Part I* and then progresses to more advanced PivotTable topics. This review is not meant to be comprehensive but is merely sufficient to provide the necessary background for delivering this course effectively.

Learning Objectives

Upon completing this chapter, participants should be able to:

- Create simple PivotTables in Excel;
- Apply desired formats to PivotTables;
- Manipulate PivotTable data using grouping and ungrouping techniques;
- Rearrange, or pivot, an existing PivotTable; and
- Update a PivotTable's underlying data.

Creating Simple PivotTables

A large portion of the productivity and information analysis benefits of using PivotTables is gained with the simplest of PivotTables. In other words, you need not be a PivotTable expert or know how to apply the advanced features of PivotTables in order to take advantage of their power and functionality. As PivotTables become more complex, the amount of learning required to take advantage of their more complex functionality naturally increases. However, for most analyses, a simple PivotTable that auto-summarizes or auto-tabulates our data will be very effective and will provide most, if not all, of the power needed.

The table of data in **Figure 1** contains sales data extracted from a general ledger. It will serve as the data source for our initial PivotTable examples. Each record represents the total sales by month for a specific product. There are four columns of data – Month, Region, Product, and Sales.

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The sales figures could be in units, thousands of units, dollars, or thousands of dollars, etc. In this case, we will assume that sales are reported in dollars.

In our sample data set, there are nearly three thousand rows of data, although many datasets may have tens or hundreds of thousands of rows. The latest version of Excel supports over one million rows in the worksheet grid, so it is possible to have extremely large datasets as the basis for PivotTables. There are no limits on the *amount* of data that can be used in a PivotTable, but the more data there is to summarize or analyze, the greater the power of PivotTables.

	A	B	C	D
1	Month	Region	Product	Sales
2	1/31/2010	New England	Astringent, Organic, 16 oz	8,376
3	1/31/2010	Southeast	Astringent, Organic, 16 oz	10,615
4	1/31/2010	Midwest	Astringent, Organic, 16 oz	9,532
5	1/31/2010	West	Astringent, Organic, 16 oz	8,284
6	1/31/2010	New England	Astringent, Organic, 24 oz	16,185
7	1/31/2010	Southeast	Astringent, Organic, 24 oz	19,962
8	1/31/2010	Midwest	Astringent, Organic, 24 oz	18,324
9	1/31/2010	West	Astringent, Organic, 24 oz	15,665
10	1/31/2010	New England	Astringent, Organic, 32 oz	24,130
11	1/31/2010	Southeast	Astringent, Organic, 32 oz	29,672
12	1/31/2010	Midwest	Astringent, Organic, 32 oz	26,629
13	1/31/2010	West	Astringent, Organic, 32 oz	23,608
14	1/31/2010	New England	Astringent, Organic, 48 oz	7,862
15	1/31/2010	Southeast	Astringent, Organic, 48 oz	9,392
16	1/31/2010	Midwest	Astringent, Organic, 48 oz	8,706

Figure 1 – Data for Simple PivotTable Examples

In our first example, we would like to tabulate the sales figures presented in **Figure 1** by Product and by Month of sale. Our completed PivotTable will have rows for the Products and Months for the columns.

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To create a simple PivotTable from our data, do the following.

1. Place the cursor in the data and choose **PivotTable** from the **Insert** tab as shown in **Figure 2**.

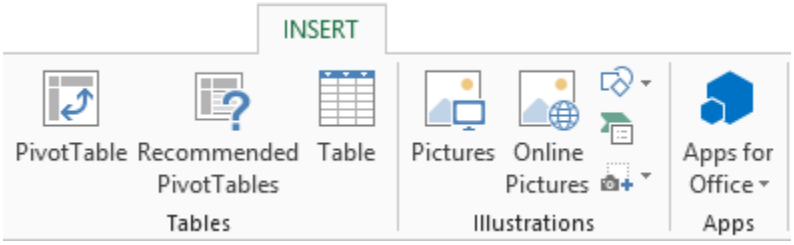

Figure 2 – Selecting PivotTable from the Insert Tab

2. In the resulting **Create PivotTable** dialog box shown in **Figure 3**, the data range should already be defined. If not, click the **Collapse Dialog** button and highlight the data range. Make sure that your entire data range is selected, including the field names at the top of the data columns. Select **New Worksheet** and then click **OK**. Note that a *table* can serve as a dynamic data range for a PivotTable in the latest version of Excel.

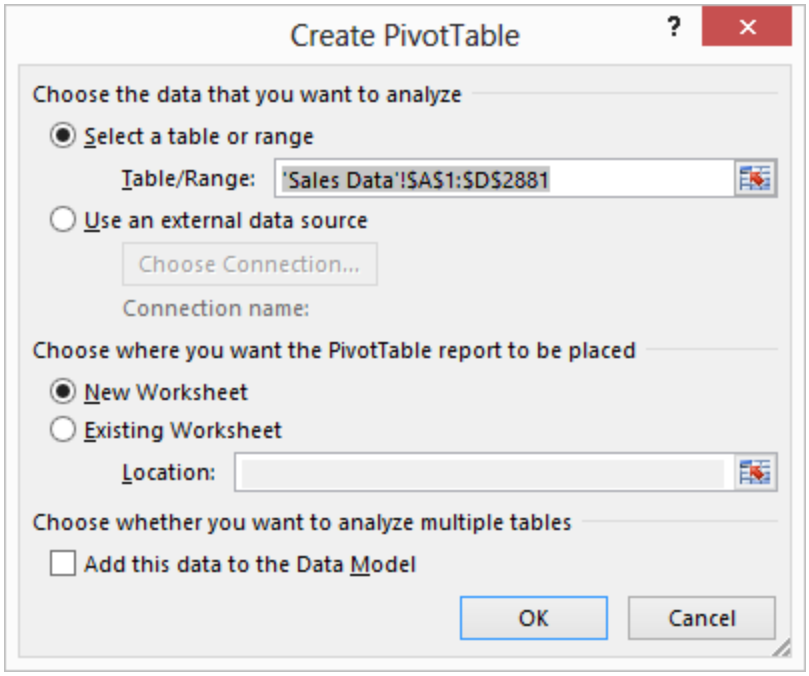

Figure 3 – Highlighting the Data Range and Selecting New Worksheet

3. A new worksheet like the one shown in **Figure 4** will be inserted in the workbook. On the left side of the worksheet is a placeholder for the PivotTable report to be created. On the right side is the **PivotTable Task Pane**. The layout of the task pane can be customized to a user's needs by clicking the drop-down button in the top right corner of the task pane just below the title bar.

   The task pane contains the **PivotTable Field List** at the top and four quadrant boxes into which fields are dragged from the list to create the PivotTable. The quadrants, or *drop areas*,

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correspond to the four areas of a PivotTable report: Filters, Columns (column fields), Rows (row fields), and Values (data area).

> ⓘ Experienced PivotTable users will recognize Filters as Report Filters or Page Fields in earlier versions of Excel. Filters are a more descriptive name for existing functionality. Filters serve the same function and work exactly as Report Filter or Page Fields.

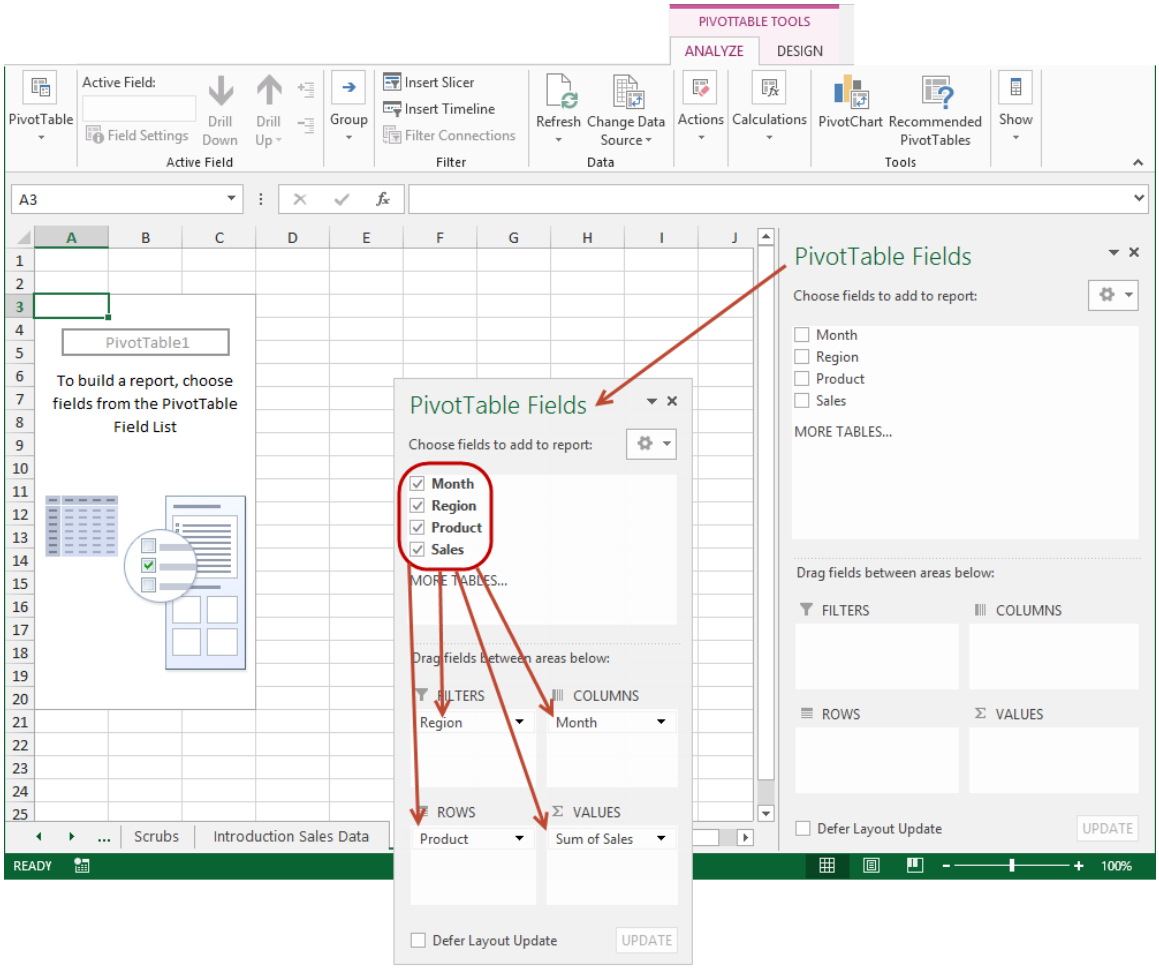

Figure 4 – Creating a PivotTable by Dragging Fields to the Quadrants

4. Now, drag each of the fields, in turn, from the field list at the top of the **PivotTable Task Pane** to the report quadrants at the bottom as shown in **Figure 4**.

   Click on the **Month** field, hold down your left mouse button, drag and point to the **Columns** quadrant, and then release your left mouse button.

   Similarly, drag the **Product** field to the **Rows** quadrant, the **Region** field to the **Filters** quadrant, and the **Sales** field to the **Values** quadrant.

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Figure 5 shows the results of our efforts. Note that some of the monthly columns have been removed from the PivotTable for presentation. The table summarizes the raw data in a two-dimensional table with Months across the top and Products down the left margin. Also, note how Excel totaled each row and column automatically.

	A	B	C	D	AL
1	Region	(All)			
2					
3	**Sum of Sales**	**Column Labels**			
4	**Row Labels**	**1/31/2010**	**2/28/2010**	**3/31/2010**	**Grand Total**
5	Astringent, Organic, 16 oz	36,807	39,025	34,673	1,687,975
6	Astringent, Organic, 24 oz	70,136	76,210	66,039	3,229,255
7	Astringent, Organic, 32 oz	104,039	111,163	98,487	4,811,747
8	Astringent, Organic, 48 oz	33,961	36,569	32,929	1,574,549
9	Cream, Aloe Vera Hand, 9 oz	37,931	40,905	36,886	1,771,135
10	Cream, Extra Moisturizing Hand, 9 oz	40,120	44,458	38,846	1,882,818
11	Cream, Hand and Body, 16 oz	69,911	76,446	67,563	3,255,935
12	Lotion, Extra Moisturizing Body, 9 oz	37,920	40,849	36,596	1,753,827
13	Lotion, Organic Body, 16 oz	82,933	89,972	79,754	3,816,665
14	Lotion, Organic Body, 24 oz	118,826	129,375	113,565	5,525,633
15	Lotion, Organic Body, 9 oz	43,573	47,497	40,448	2,000,073
16	Lotion, Organic Hand and Body, 16 oz	86,458	92,724	81,312	3,997,025
17	Lotion, Organic Hand and Body, 9 oz	47,297	49,895	44,654	2,158,423
18	Mask, Organic Facial, 9 oz	75,731	79,948	74,178	3,516,366
19	Mask, Wrinkle Reducing Facial, 16 oz	23,814	21,160	18,814	915,242
20	Mask, Wrinkle Reducing Facial, 24 oz	35,505	31,994	28,283	1,371,898
21	Mask, Wrinkle Reducing Facial, 9 oz	104,264	114,865	98,868	4,832,068
22	Scrub, Hypo-Allergenic, 16 oz	37,020	39,373	34,719	1,677,814
23	Scrub, Hypo-Allergenic, 24 oz	64,346	68,812	60,814	2,960,158
24	Scrub, Hypo-Allergenic, 9 oz	32,625	35,038	30,642	1,496,257
25	**Grand Total**	**1,183,217**	**1,266,278**	**1,118,070**	**54,234,863**

Figure 5 – Simple PivotTable Report Created with a Few Clicks

Creating a PivotTable in the PivotTable Task Pane is only available in the 2007 and later versions of Excel. In versions prior to 2007, fields were dragged from the Field List to a PivotTable report template to create a report. For experienced users who prefer to use the former method, a setting can be changed in PivotTable options to allow the method. Right-click on an existing PivotTable or PivotTable placeholder and select **PivotTable Options**. In the **PivotTable Options** dialog box, select **Classic PivotTable Layout** on the **Display** tab. This setting can also be modified from the **PivotTable Tools** contextual tab.

Since the simplest PivotTable reports provide a significant proportion of the power of PivotTables, let's investigate a few report formatting techniques before we examine more powerful features.

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First, turn off the field headers in the report for presentation. Click **Field Headers** on the **PivotTable Tools, Analyze** tab to turn off the headers as shown in **Figure 6**. Next, rename the Sum of Sales label by typing the desired label into the cell. Simply click in the cell containing the label **Sum of Sales** and enter **Sales by Product**.

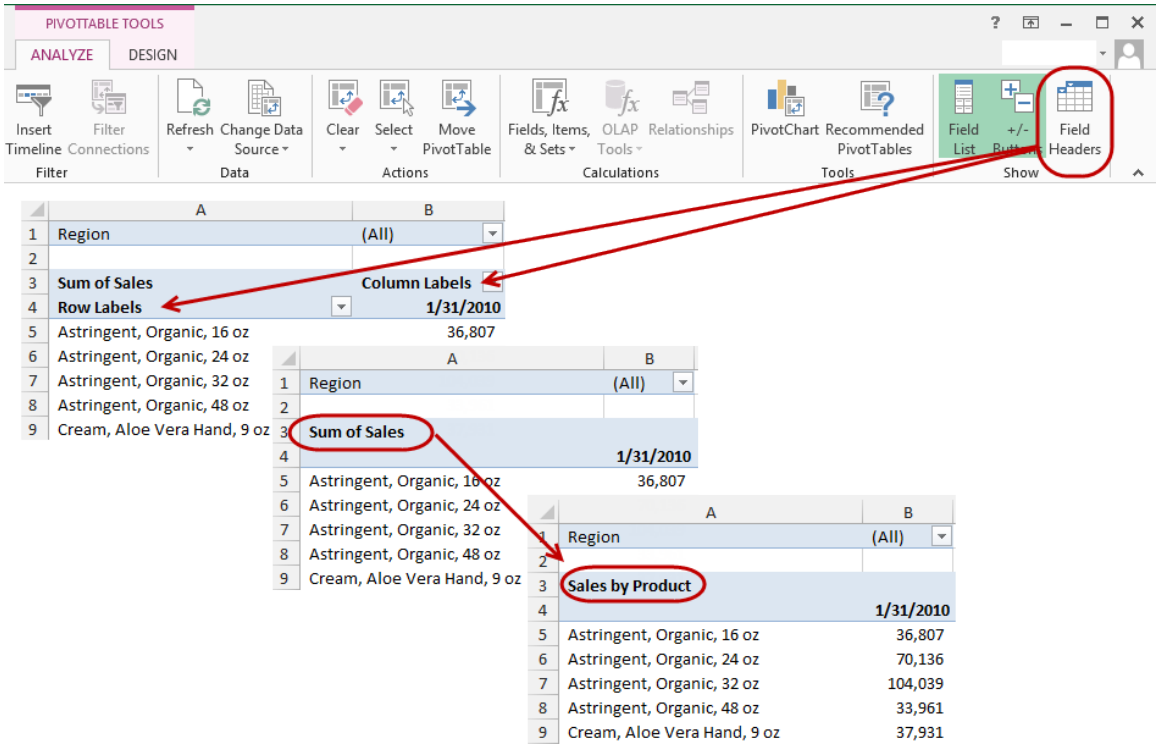

Figure 6 – Hiding the Field Headers and Entering a Descriptive Label for Presentation

Cells in a PivotTable can be formatted for printing and display just as with any other cell or range of cells. In our example PivotTable, we will format the sales values in the Accounting format with zero decimals and without dollar signs. We will also format the first and total rows with dollar signs for presentation. Additionally, Excel has a large number of built-in visual styles with which to format PivotTables automatically. These styles, available in the **PivotTables Styles** gallery on the **PivotTable Tools, Design** contextual tab, contain a wide variety of colors and formatting for the table, table headers, and total and subtotal rows. **Figure 7** shows our PivotTable report with the values formatted as dollars and one of the built-in styles applied.

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	A	B	C	AL
1	Region	(All)		
2				
3	**Sales by Product**			
4		**1/31/2010**	**2/28/2010**	**Grand Total**
5	Astringent, Organic, 16 oz	$ 36,807	$ 39,025	$ 1,687,975
6	Astringent, Organic, 24 oz	70,136	76,210	3,229,255
7	Astringent, Organic, 32 oz	104,039	111,163	4,811,747
8	Astringent, Organic, 48 oz	33,961	36,569	1,574,549
9	Cream, Aloe Vera Hand, 9 oz	37,931	40,905	1,771,135
10	Cream, Extra Moisturizing Hand, 9 oz	40,120	44,458	1,882,818
11	Cream, Hand and Body, 16 oz	69,911	76,446	3,255,935
12	Lotion, Extra Moisturizing Body, 9 oz	37,920	40,849	1,753,827
13	Lotion, Organic Body, 16 oz	82,933	89,972	3,816,665
14	Lotion, Organic Body, 24 oz	118,826	129,375	5,525,633
15	Lotion, Organic Body, 9 oz	43,573	47,497	2,000,073
16	Lotion, Organic Hand and Body, 16 oz	86,458	92,724	3,997,025
17	Lotion, Organic Hand and Body, 9 oz	47,297	49,895	2,158,423
18	Mask, Organic Facial, 9 oz	75,731	79,948	3,516,366
19	Mask, Wrinkle Reducing Facial, 16 oz	23,814	21,160	915,242
20	Mask, Wrinkle Reducing Facial, 24 oz	35,505	31,994	1,371,898
21	Mask, Wrinkle Reducing Facial, 9 oz	104,264	114,865	4,832,068
22	Scrub, Hypo-Allergenic, 16 oz	37,020	39,373	1,677,814
23	Scrub, Hypo-Allergenic, 24 oz	64,346	68,812	2,960,158
24	Scrub, Hypo-Allergenic, 9 oz	32,625	35,038	1,496,257
25	**Grand Total**	**$1,183,217**	**$1,266,278**	**$54,234,863**

Figure 7 – PivotTable with Accounting Format and Style Applied

Users can add and remove subtotals and grand totals as well as row and column banding (which use shading so that data points in rows or columns are easily identified) by using buttons and check boxes accessible on the **PivotTable Tools, Design** contextual tab.

Excel also provides three built-in report layouts – **Compact**, **Outline**, and **Tabular** – that alter the way the report is displayed. The Compact form, which is the default, displays multiple row fields in a single expandable and collapsible column. Field names are hidden on the report. The Tabular form is the familiar PivotTable layout that experienced users have been using for years. Multiple row fields are displayed in multiple columns, and the worksheet grid is visible. The Outline form is similar to the Tabular form, but the worksheet grid is not visible in the report. All of the layouts are available from the **PivotTable Tools, Design** contextual tab.

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Grouping and Ungrouping Data

Now, let's examine some of the power of PivotTables. To calculate and display quarterly sales totals for each of the products, simply group the months into quarters and the quarters into years. Position the cursor in a cell containing one of the monthly column headings, such as **1/31/2010**. Right-click and choose **Group** to open the **Grouping** dialog box. In the **By** box, click **Quarters** and **Years**, so that Months, Quarters, and Years are highlighted as shown in **Figure 8**. Click **OK** to complete the task.

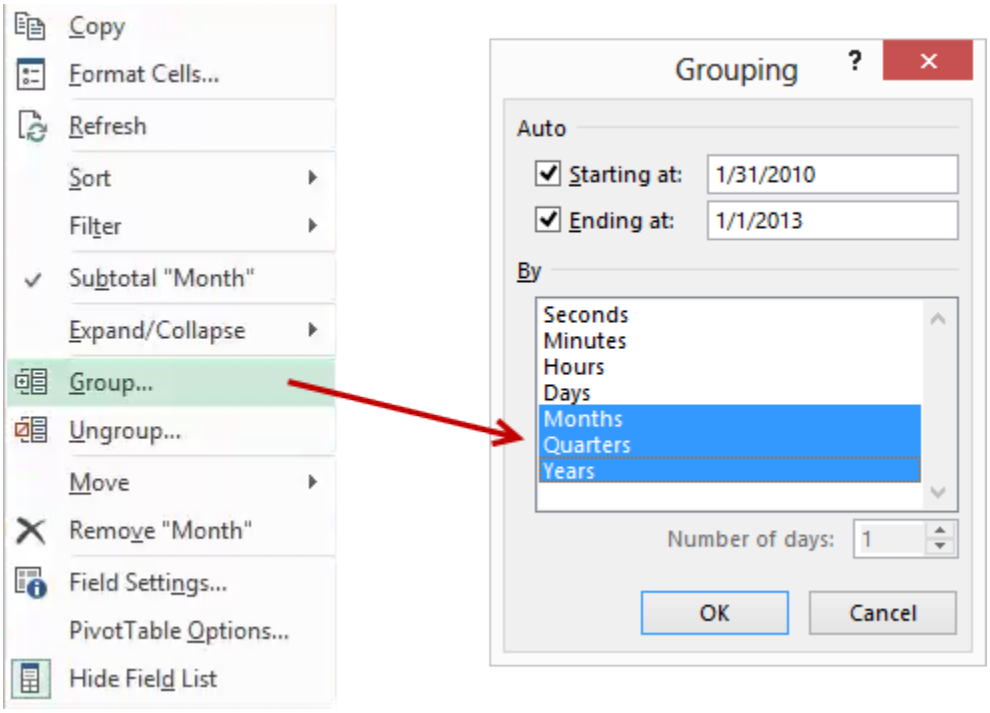

Figure 8 – Grouping Months into Quarters and Years

Turn off the field headers for presentation. On the **PivotTable Tools, Analyze** contextual tab, click on **Field Headers**. Next, position the cursor in a cell containing one of the quarterly column headings, such as **Qtr1**. Right-click on the cell and from the context-sensitive menu, select **Expand/Collapse, Collapse Entire Field** to hide the monthly detail within all quarters in the report. Then, position the cursor in a cell containing one of the yearly column headings, such as **2010**. Right-click on the cell and, from the context-sensitive menu, select **Subtotal "Years"** to add a yearly subtotal for each year. The initial results are shown in **Figure 9**. Some of the rows have been removed for presentation.

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	A	B	C	D	E	F
1	Region	(All)				
2						
3	**Sales by Product**					
4		⊟ **2010**				**2010 Total**
5		⊞ **Qtr1**	⊞ **Qtr2**	⊞ **Qtr3**	⊞ **Qtr4**	
6						
7	Astringent, Organic, 16 oz	$ 110,505	$ 136,760	$ 177,620	$ 134,805	$ 559,690
8	Astringent, Organic, 24 oz	212,385	262,082	338,086	258,910	1,071,463
9	Astringent, Organic, 32 oz	313,689	394,319	506,808	382,604	1,597,420
10	Astringent, Organic, 48 oz	103,459	127,307	165,691	126,153	522,610
11	Cream, Aloe Vera Hand, 9 oz	115,722	143,364	187,025	141,108	587,219
23	Mask, Wrinkle Reducing Facial, 9 oz	317,097	359,367	508,715	387,500	1,603,519
24	Scrub, Hypo-Allergenic, 16 oz	111,112	135,508	174,839	135,532	556,991
25	Scrub, Hypo-Allergenic, 24 oz	193,972	240,140	311,740	236,580	982,432
26	Scrub, Hypo-Allergenic, 9 oz	98,305	121,308	156,499	119,889	496,001
27	**Grand Total**	**$ 3,567,565**	**$ 4,392,382**	**$ 5,698,954**	**$ 4,335,282**	**$ 17,994,183**

Figure 9 – Results of Grouping Quarters into Years

Again, position the cursor in a cell containing one of the yearly column headings, such as **2010**. Right-click on the cell and from the context-sensitive menu, select **Expand/Collapse, Collapse Entire Field**. Quarters are collapsed into Years, and all of the totals now reflect yearly totals as shown in **Figure 10**. Detail can be shown or hidden for a single group or an entire field from the context-sensitive menu or by clicking the plus (+) or minus (-) signs next to a group column heading.

	A	B	C	D	E
1	Region	(All)			
2					
3	**Sales by Product**				
4		⊞ **2010**	⊞ **2011**	⊞ **2012**	**Grand Total**
5					
6					
7	Astringent, Organic, 16 oz	$ 559,690	$ 593,381	$ 534,904	$ 1,687,975
8	Astringent, Organic, 24 oz	1,071,463	1,135,767	1,022,025	3,229,255
9	Astringent, Organic, 32 oz	1,597,420	1,692,111	1,522,216	4,811,747
10	Astringent, Organic, 48 oz	522,610	553,627	498,312	1,574,549
11	Cream, Aloe Vera Hand, 9 oz	587,219	622,281	561,635	1,771,135
12	Cream, Extra Moisturizing Hand, 9 oz	624,293	661,269	596,656	1,882,818
22	Mask, Wrinkle Reducing Facial, 24 oz	454,917	482,208	434,573	1,371,8[illegible]
23	Mask, Wrinkle Reducing Facial, 9 oz	1,603,519	1,699,127	1,529,422	4,832,068
24	Scrub, Hypo-Allergenic, 16 oz	556,991	590,059	530,764	1,677,814
25	Scrub, Hypo-Allergenic, 24 oz	982,432	1,040,959	936,767	2,960,158
26	Scrub, Hypo-Allergenic, 9 oz	496,001	525,883	474,373	1,496,257
27	**Grand Total**	**$ 17,994,183**	**$ 19,068,876**	**$ 17,171,804**	**$ 54,234,863**

Figure 10 – Quarterly Data Collapsed into Years

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To see the detail observations that underlie any of the cells, just double-click on the cell of interest. Excel will insert a new sheet containing the detail observations that created the cell contents. For example, if a user clicked on the cell containing the sales total of $559,690 for Astringent, 16 oz, Organic in 2010, Excel will display the underlying detail as shown in **Figure 11**. Note that the data is presented in *table* form and format, which makes it easy to filter, analyze, and total.

	A	B	C	D
1	Month	Region	Product	Sales
2	1/31/2010	New England	Astringent, Organic, 16 oz	8,376
3	1/31/2010	Southeast	Astringent, Organic, 16 oz	10,615
4	1/31/2010	Midwest	Astringent, Organic, 16 oz	9,532
5	1/31/2010	West	Astringent, Organic, 16 oz	8,284
6	2/28/2010	West	Astringent, Organic, 16 oz	8,768
7	2/28/2010	Midwest	Astringent, Organic, 16 oz	10,305
43	11/30/2010	Midwest	Astringent, Organic, 16 oz	11,455
44	11/30/2010	Southeast	Astringent, Organic, 16 oz	12,106
45	11/30/2010	New England	Astringent, Organic, 16 oz	10,150
46	12/31/2010	West	Astringent, Organic, 16 oz	8,802
47	12/31/2010	Midwest	Astringent, Organic, 16 oz	11,291
48	12/31/2010	Southeast	Astringent, Organic, 16 oz	12,218
49	12/31/2010	New England	Astringent, Organic, 16 oz	9,892

Figure 11 – Drilling to Detail from a PivotTable

Custom Groups

In the example PivotTable, data items have been summarized thus far using built-in groups, such as when months were grouped into quarters and years. However, Excel also allows data to be grouped with user-defined groups. To accomplish this task, first highlight the items to be grouped together. Then, right-click and select **Group** from the context-sensitive menu.

In the example PivotTable, we would like to group the products into one of four product groups – Creams, Lotions, Masks, and Facial Cleansers. Creams make up the Creams product group, lotions make up the Lotions group, and masks make up the Masks group. Facial Cleansers are made up of astringents and scrubs. First, highlight each of the **Astringent** products. Then, hold down the **CTRL** key while highlighting each of the **Scrub** products. Next, right-click and choose **Group** from the context- sensitive menu. This combines the astringent and scrub products into a single group. Rename **Group1** to **Facial Cleansers** to complete the first group as shown in **Figure 12**.

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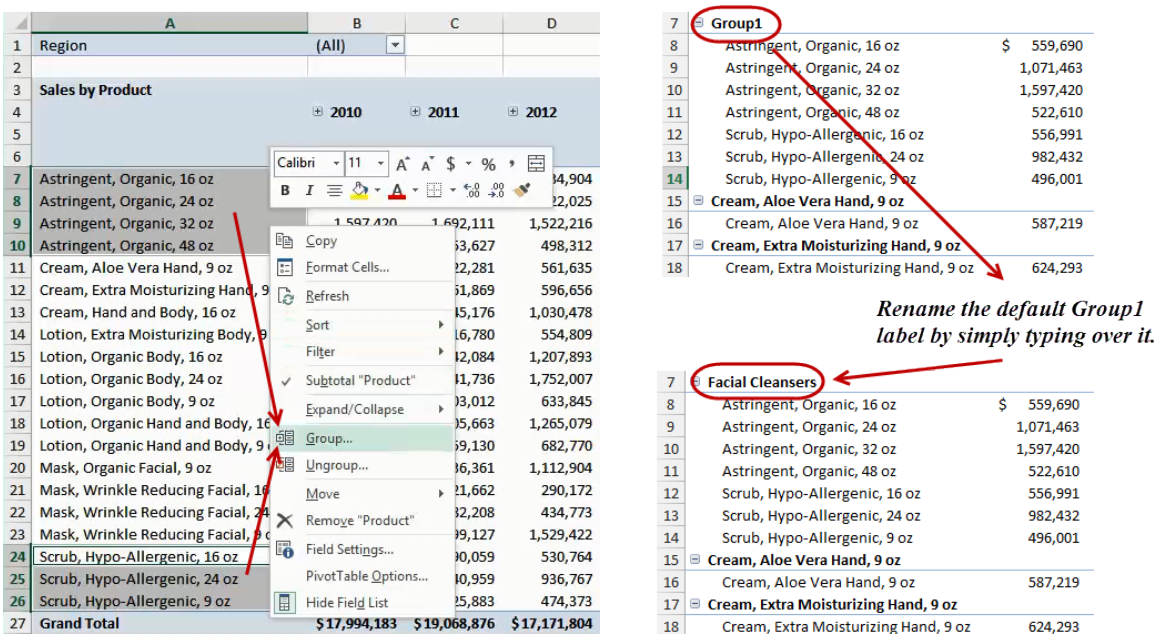

Figure 12 – Grouping Products into Product Groups

Repeat the steps for each of the three remaining groups – Creams, Lotions, and Masks. To complete the PivotTable, add subtotals for each of the product groups. Position the cursor in a cell containing one of the group row headings, such as **Facial Cleansers**. Right-click on the cell and from the context-sensitive menu, select **Subtotal "Product2"** to add a subtotal for each product group. The completed report should resemble the one shown in **Figure 13**.

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3	Sales by Product				
4		⊞ 2010	⊞ 2011	⊞ 2012	Grand Total
5					
6					
7	⊟ **Facial Cleansers**	**5,786,607**	**6,131,787**	**5,519,361**	**17,437,755**
8	Astringent, Organic, 16 oz	559,690	593,381	534,904	1,687,975
9	Astringent, Organic, 24 oz	1,071,463	1,135,767	1,022,025	3,229,255
10	Astringent, Organic, 32 oz	1,597,420	1,692,111	1,522,216	4,811,747
11	Astringent, Organic, 48 oz	522,610	553,627	498,312	1,574,549
12	Scrub, Hypo-Allergenic, 16 oz	556,991	590,059	530,764	1,677,814
13	Scrub, Hypo-Allergenic, 24 oz	982,432	1,040,959	936,767	2,960,158
14	Scrub, Hypo-Allergenic, 9 oz	496,001	525,883	474,373	1,496,257
15	⊟ **Creams**	**2,291,793**	**2,429,326**	**2,188,769**	**6,909,888**
16	Cream, Aloe Vera Hand, 9 oz	587,219	622,281	561,635	1,771,135
17	Cream, Extra Moisturizing Hand, 9 oz	624,293	661,869	596,656	1,882,818
18	Cream, Hand and Body, 16 oz	1,080,281	1,145,176	1,030,478	3,255,935
19	⊟ **Lotions**	**6,386,838**	**6,768,405**	**6,096,403**	**19,251,646**
20	Lotion, Extra Moisturizing Body, 9 oz	582,238	616,780	554,809	1,753,827
21	Lotion, Organic Body, 16 oz	1,266,688	1,342,084	1,207,893	3,816,665
22	Lotion, Organic Body, 24 oz	1,831,890	1,941,736	1,752,007	5,525,633
23	Lotion, Organic Body, 9 oz	663,216	703,012	633,845	2,000,073
24	Lotion, Organic Hand and Body, 16 oz	1,326,283	1,405,663	1,265,079	3,997,025
25	Lotion, Organic Hand and Body, 9 oz	716,523	759,130	682,770	2,158,423
26	⊟ **Masks**	**3,528,945**	**3,739,358**	**3,367,271**	**10,635,574**
27	Mask, Organic Facial, 9 oz	1,167,101	1,236,361	1,112,904	3,516,366
28	Mask, Wrinkle Reducing Facial, 16 oz	303,408	321,662	290,172	915,242
29	Mask, Wrinkle Reducing Facial, 24 oz	454,917	482,208	434,773	1,371,898
30	Mask, Wrinkle Reducing Facial, 9 oz	1,603,519	1,699,127	1,529,422	4,832,068
31	**Grand Total**	**$17,994,183**	**$19,068,876**	**$17,171,804**	**$54,234,863**

Figure 13 – PivotTable with Product Groups and Subtotals

Note that the default field name, **Product2**, given by Excel to the product group can be renamed in **Field Settings**. Right-click on any one of the group labels and select **Field Settings** from the context-sensitive menu. In the **Field Settings** dialog box, type in the desired field name, such as *Product Group*, in the **Custom Name** box and click **OK**.

Also, note that the default Compact layout puts group subtotals at the top of the group on the same line with the group name. If subtotals are desired at the bottom of each group, select **Subtotals, Show All Subtotals at Bottom of Group** on the **PivotTable Tools, Design** contextual tab. Alternatively, right-click on any one of the group labels and select **Field Settings**. In the **Field Settings** dialog box on the **Layout & Print** tab, uncheck **Display subtotals at the top of each group** and click **OK**.

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Any items within a field may be custom grouped to form another field. Custom grouping may also be necessary when built-in groups are not consistent with a company's practices. For example, when months are grouped into quarters, the built-in groups use a calendar year to define the quarters, potentially creating issues for companies using fiscal years rather than calendar years. To resolve this issue, use the choose function and add columns to your data defining the fiscal quarters and years as shown in the teaching file from the Chapter 1 folder called ***F1 through F15 - Simple PivotTables.xlsx.***

Pivoting Columns and Rows

The summarized table can be rearranged, or pivoted, to show the data from any perspective. Along with the ability to group or ungroup data, being able to immediately rearrange the table is among the most powerful features of PivotTables. For example, if users wanted to display products as the columns and yearly totals as the rows, they would simply rearrange the rows and columns by dragging and dropping the fields in the quadrant boxes. Continuing with our example PivotTable, the following steps demonstrate the ease of rearranging a PivotTable report.

1. Position the cursor in the PivotTable report to display the **PivotTable Task Pane**. In the field list at the top of the task pane, uncheck **Month**, **Region**, **Product**, and **Quarters** to remove them from the report. Click on **Years** and drag it into the **Rows** quadrant and drop it below **Product Group**. This has the effect of reporting Years within Product Groups as shown in **Figure 14**.

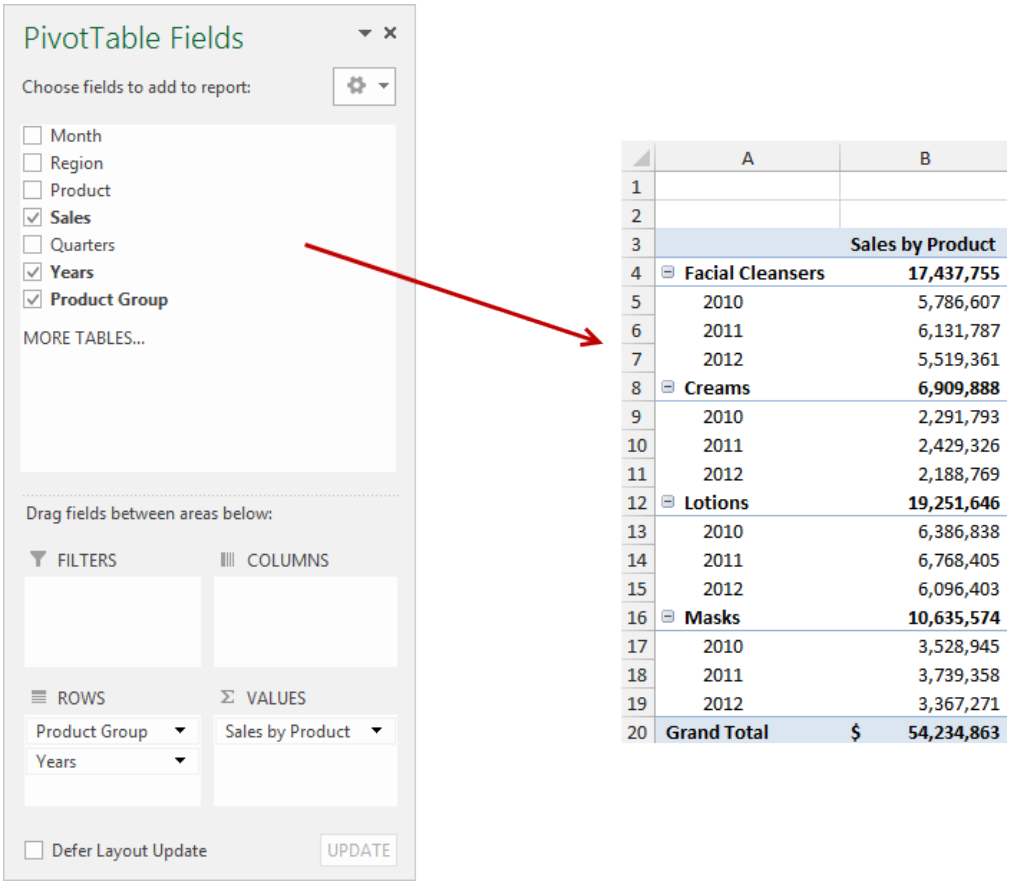

Figure 14 – Dragging Fields in the PivotTable Task Pane to Rearrange a Report

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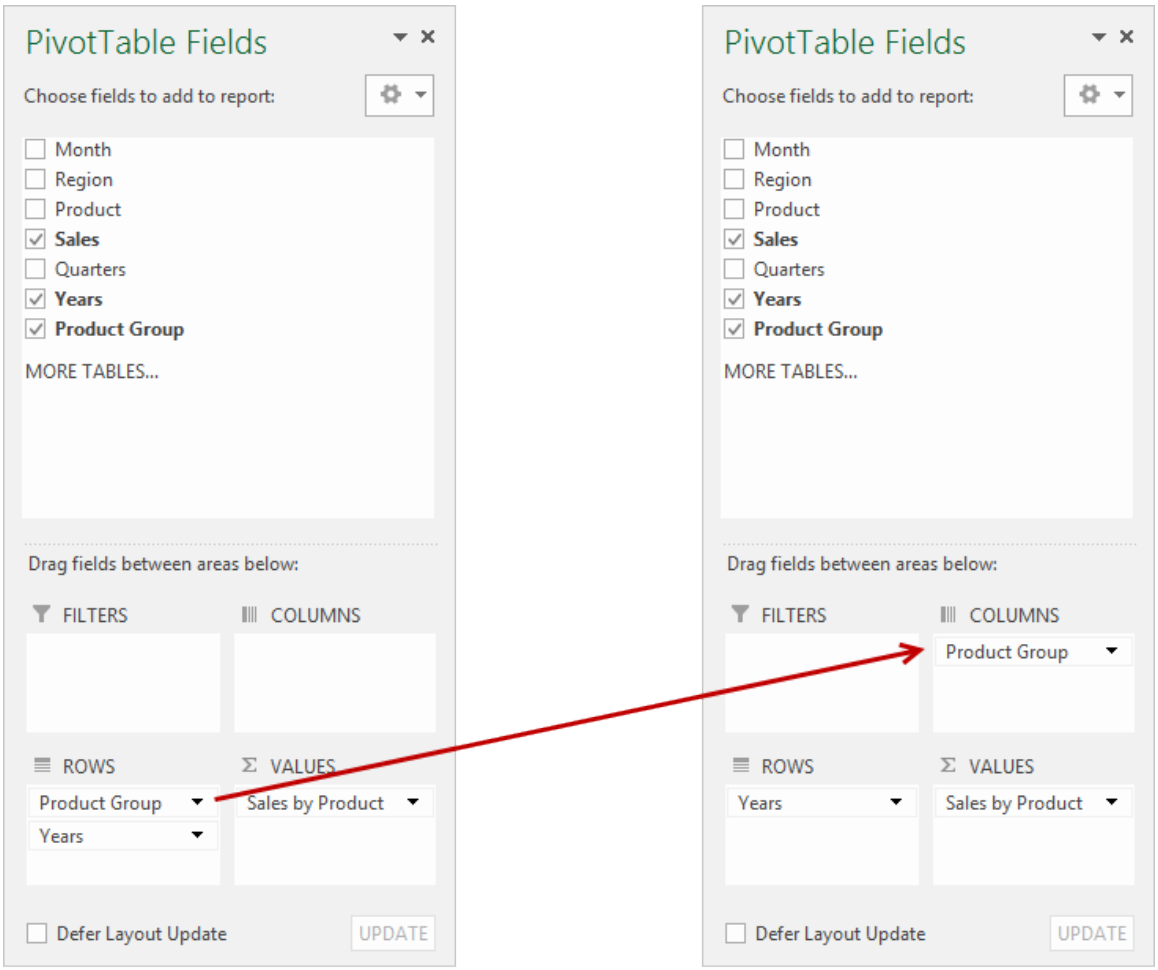
2. Now, click on **Product Groups** and drag-and-drop it into the **Columns** quadrant. This rearranges the report so that Product Groups are the columns, and Years are the rows as shown in **Figure 15**.



	A	B	C	D	E	F
1						
2						
3	**Sales by Product**					
4		**Facial Cleansers**	**Creams**	**Lotions**	**Masks**	**Grand Total**
5	2010	5,786,607	2,291,793	6,386,838	3,528,945	17,994,183
6	2011	6,131,787	2,429,326	6,768,405	3,739,358	19,068,876
7	2012	5,519,361	2,188,769	6,096,403	3,367,271	17,171,804
8	**Grand Total**	**$ 17,437,755**	**$ 6,909,888**	**$ 19,251,646**	**$ 10,635,574**	**$ 54,234,863**

Figure 15 – Completing the Drag-and-Drop Rearrangement of a Report

To review, we are simply dragging the field buttons to different quadrants in the PivotTable Task Pane in order to rearrange the report. We can view a report with Months, Quarters, and/or Years across the columns and Products and/or Product Groups as the rows, or Products and/or Product Groups as the columns and Months, Quarters, and/or Years as the rows,

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Months within Product Groups, or Products within Quarters, etc. The number of ways that we can view a PivotTable is limited only by the number of fields that we have to display and our imagination.

Updating the Underlying Data

Whenever data is changed, updated, or added to the underlying data table, a user must refresh the PivotTable to see the changes reflected in the report. Position the cursor anywhere in the table, then right-click, and choose **Refresh** from the context-sensitive menu. Alternatively, click the **Refresh** button on the **PivotTable Tools, Analyze** contextual tab. Note that it is best practice to always refresh a PivotTable after re-arranging a complex report.

If data is added or removed from the data range and the size of the range changes, then users *may* have to modify the data range. If the data range is an Excel *table*, no action is necessary, other than to refresh the report as described in the preceding paragraph. A table is a dynamic range that readjusts its dimensions automatically as data is added or removed. Similarly, if the data range is a *named dynamic range*, the only action that is necessary is to refresh the PivotTable report. The use of tables and named dynamic ranges is covered in detail in K2E Canada Inc.'s ***Excel PivotTables – Part I***.

If the data range is an ordinary Excel range specified using cell references, the data range must be adjusted. To adjust the data range, position the cursor in the PivotTable report. On the **PivotTable Tools, Analyze** contextual tab, click **Change Data Source**. In the **Change PivotTable Data Source** dialog box, re-specify the data range and click **OK**. The existing PivotTable will be updated to reflect the new data.

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Chapter

2

Creating Calculations in PivotTables

While PivotTables can summarize tremendous volumes of data without requiring users to enter formulas, it is possible to add your own formulas to PivotTables as well, so as to cause the PivotTable to perform other types of calculations without creating formulas. In this chapter, you will learn how to work with field settings, calculated fields, and calculated items to create calculations in PivotTables.

Learning Objectives

Upon completing this chapter, participants should be able to:

- List four fundamental issues associated with calculations in PivotTables;
- Use Field Settings to manipulate how a PivotTable summarizes and displays data;
- Distinguish between calculated fields and calculated items and create calculations based on both; and
- Build advanced calculations such as variances and running totals in PivotTables.

Fundamental Calculation Issues in PivotTables

Creating calculations in PivotTables is a source of frustration for new and experienced PivotTable users. The general rules are 1) calculations should be made *inside* a PivotTable so that the reported data remains meaningful as the PivotTable is rearranged, and 2) each summarizing column stands alone, thereby requiring its own data set. If sales data is to be summarized in five columns, then the sales data must be added to the PivotTable template five times. Here is a list of the major issues that are related to creating calculations within PivotTables.

1. PivotTables are single unitary objects that cannot be modified by inserting or deleting rows or columns. The normal method of inserting blank rows or columns in which to make calculations does not work in PivotTables. As a workaround, you may copy a PivotTable to another worksheet and then work on the copied range just as with any other worksheet. Use a triple-paste sequence to get the desired result – **Paste Special, Values** followed by **Paste Special, Formats** followed by **Paste Special, Column widths**.

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2. Formulas within PivotTables may not reference a cell or range of cells in the worksheet. They may reference other items or fields inside the PivotTable and can include constants, mathematical operators, and most Excel functions.

3. You cannot group data in a PivotTable using built-in date or numeric grouping across a *calculated item*. In other words, if you create a calculated *row* item, you cannot group *columns*, but you can group data in those that contain *calculated fields*. As a workaround, dates and numbers can be grouped across items using *custom grouping*.

4. Multiple items or fields in the same PivotTable cannot have the same name. As a workaround, add a space to the desired field or item name.

Using Field Settings to Summarize Data

In the PivotTable examples in Chapter 1, the individual data elements were summed to produce the report. By changing field settings, we can display the average sales in each cell or the minimum or maximum sales or the variance or standard deviation of the sales distribution, etc. We can also change the format of the number and assign a custom name to the field by modifying field settings. Field settings are accessible in numerous ways, including the following.

- Position the cursor in a cell containing a **Value** and select **Field Settings** from the **Active Field** group on the **PivotTable Tools, Analyze** contextual tab.

- Click the drop-down arrow of any field button in the **Value** quadrant box on the PivotTable Task Pane and select **Value Field Settings** from the menu.

- This action can also be performed by selecting **Values Field Settings** from the contextual menu that appears after you right-click on any **Value** in the PivotTable.

To change the summary function for any value field, open the **Value Field Settings** dialog box using any of the described methods. In the **Summarize value field by** list box, select the function to use in summarizing the field's values. To summarize the selected field by calculating averages, select **Average** as shown in **Figure 16**.

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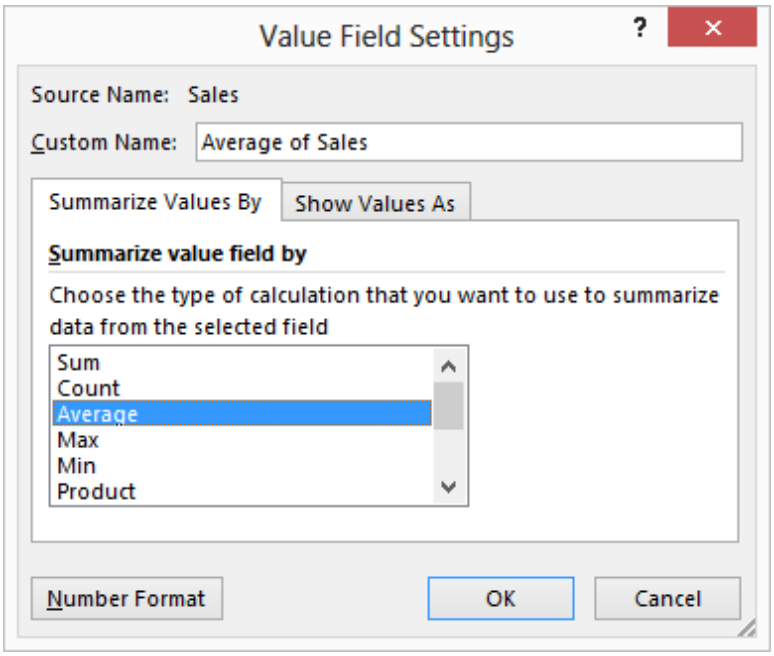

Figure 16 – Changing the Summary Function for a Value Field

You can also change how the PivotTable summarizes a value field by right-clicking on the field in the PivotTable and choosing **Summarize Values By** in the resulting contextual menu.

In the next example, a PivotTable report that displays four columns, one each for the total annual sales by product, the average sales by product, and the minimum and maximum sales by product will be created. Since the statistics are calculated on sales data, the sales field must be dragged to the **Values** quadrant four times, once for each summary column to be displayed. The Field Settings (field name and summary function) for each field are then modified, in turn, to reflect the appropriate calculation. **Figure 17** illustrates this process and the finished report.

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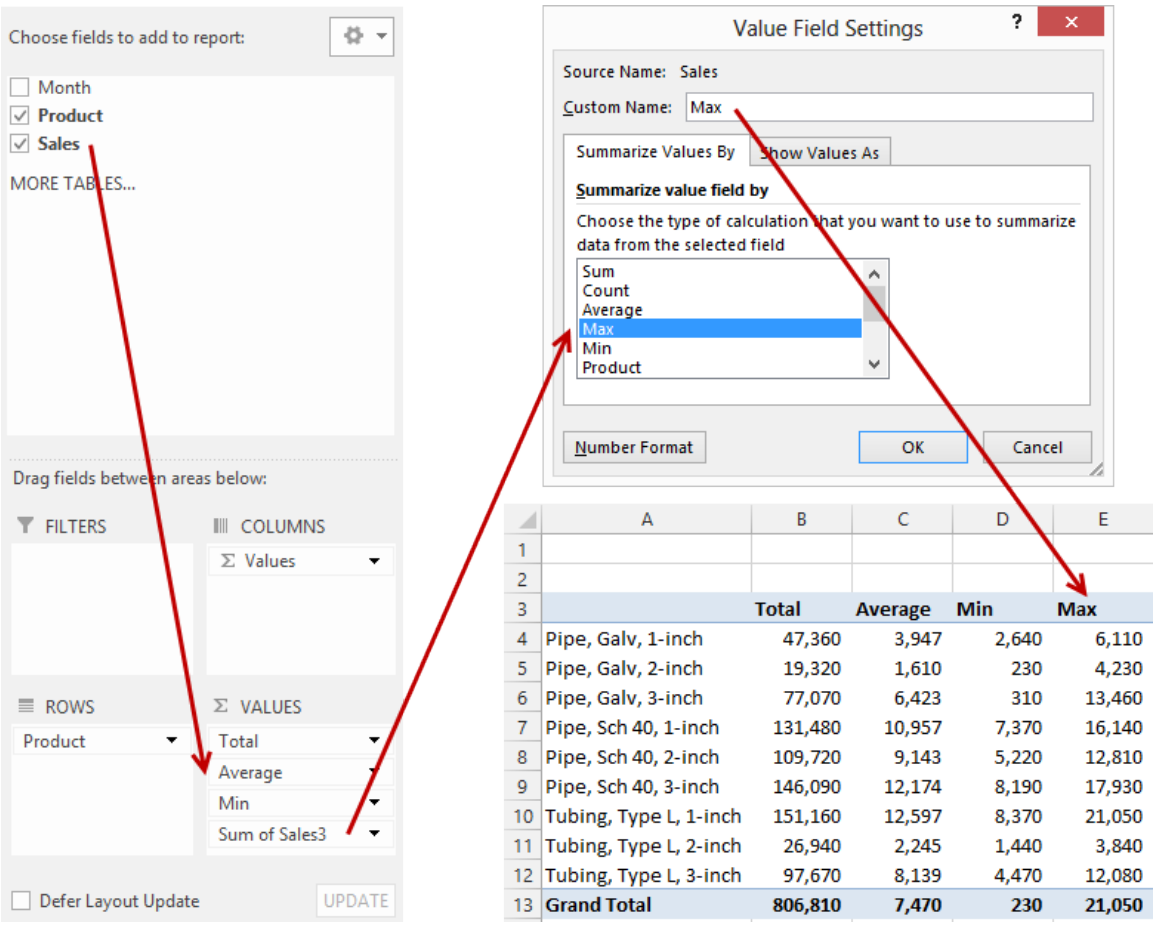

Figure 17 – Creating a Multicolumn PivotTable to Display Sales Statistics

Let's add another column to our report. In this final example, the CFO would like to have a column that displays the sales of each product as a percentage of total sales. Since the column is to summarize sales data, the **Sales** field must be dragged to the **Values** area once again, a fifth time, between the Total and Average values. Click on the **Sum of Sales** value field and select **Value Field Settings**. Click on the **Show Values As** tab and in the **Show values as** drop-down list, select **% of Column Total**. Type in **Percent** as the new **Custom Name** and select **OK**. Adjust the column widths to complete the PivotTable report as shown in **Figure 18**.

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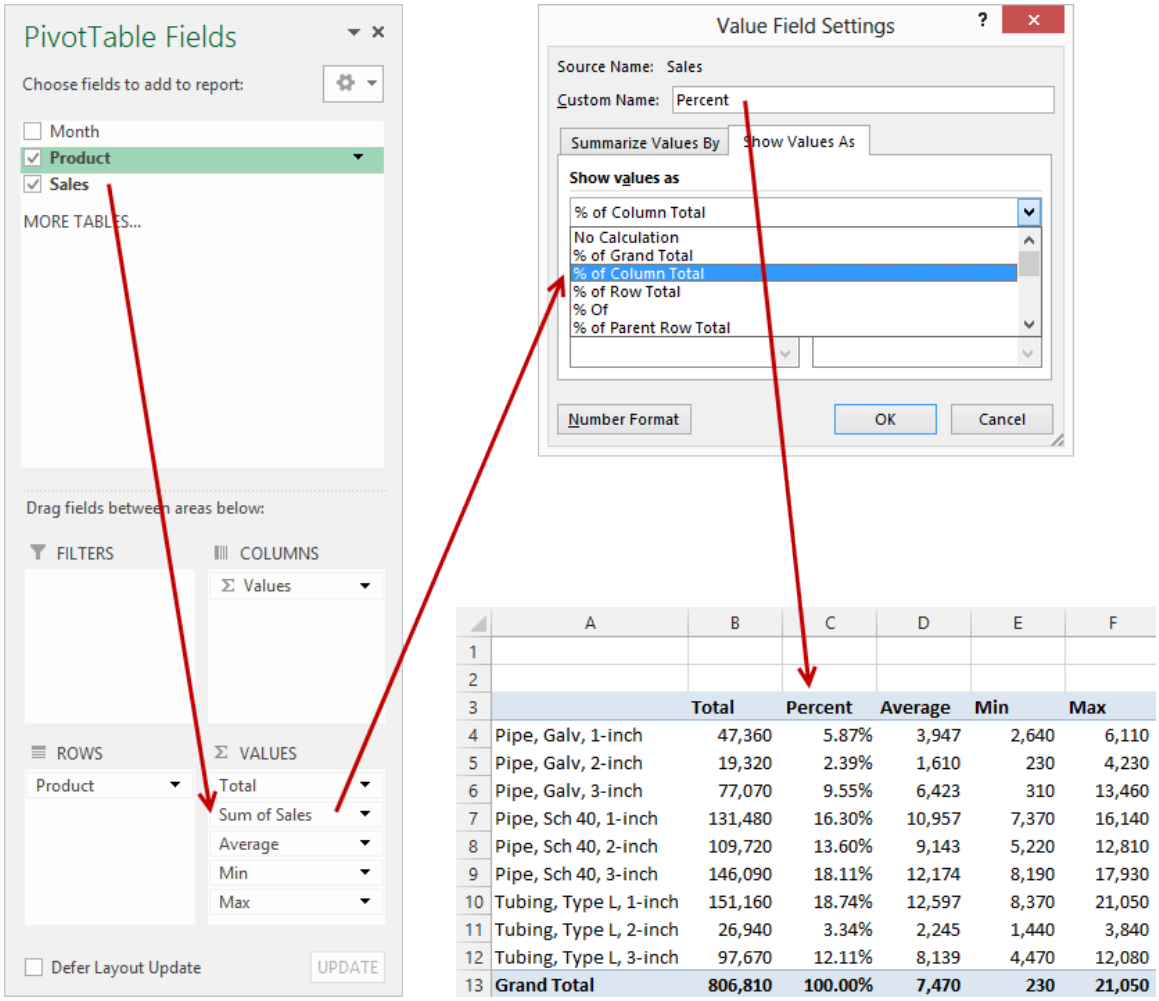

	A	B	C	D	E	F
1						
2						
3		Total	Percent	Average	Min	Max
4	Pipe, Galv, 1-inch	47,360	5.87%	3,947	2,640	6,110
5	Pipe, Galv, 2-inch	19,320	2.39%	1,610	230	4,230
6	Pipe, Galv, 3-inch	77,070	9.55%	6,423	310	13,460
7	Pipe, Sch 40, 1-inch	131,480	16.30%	10,957	7,370	16,140
8	Pipe, Sch 40, 2-inch	109,720	13.60%	9,143	5,220	12,810
9	Pipe, Sch 40, 3-inch	146,090	18.11%	12,174	8,190	17,930
10	Tubing, Type L, 1-inch	151,160	18.74%	12,597	8,370	21,050
11	Tubing, Type L, 2-inch	26,940	3.34%	2,245	1,440	3,840
12	Tubing, Type L, 3-inch	97,670	12.11%	8,139	4,470	12,080
13	**Grand Total**	**806,810**	**100.00%**	**7,470**	**230**	**21,050**

Figure 18 – Using Percentage of Column to Display Sales as a Percentage of Total Sales

For those who have upgraded to Excel 2010 or newer, this process has been simplified in that the **Show values as** options are accessible directly from a context-sensitive menu. Once the Sales field has been dragged to the **Values** quadrant a fifth time, right-click on a value in the PivotTable. Select **Show Values As** from the menu and select a calculation option from the list as shown in **Figure 19**.

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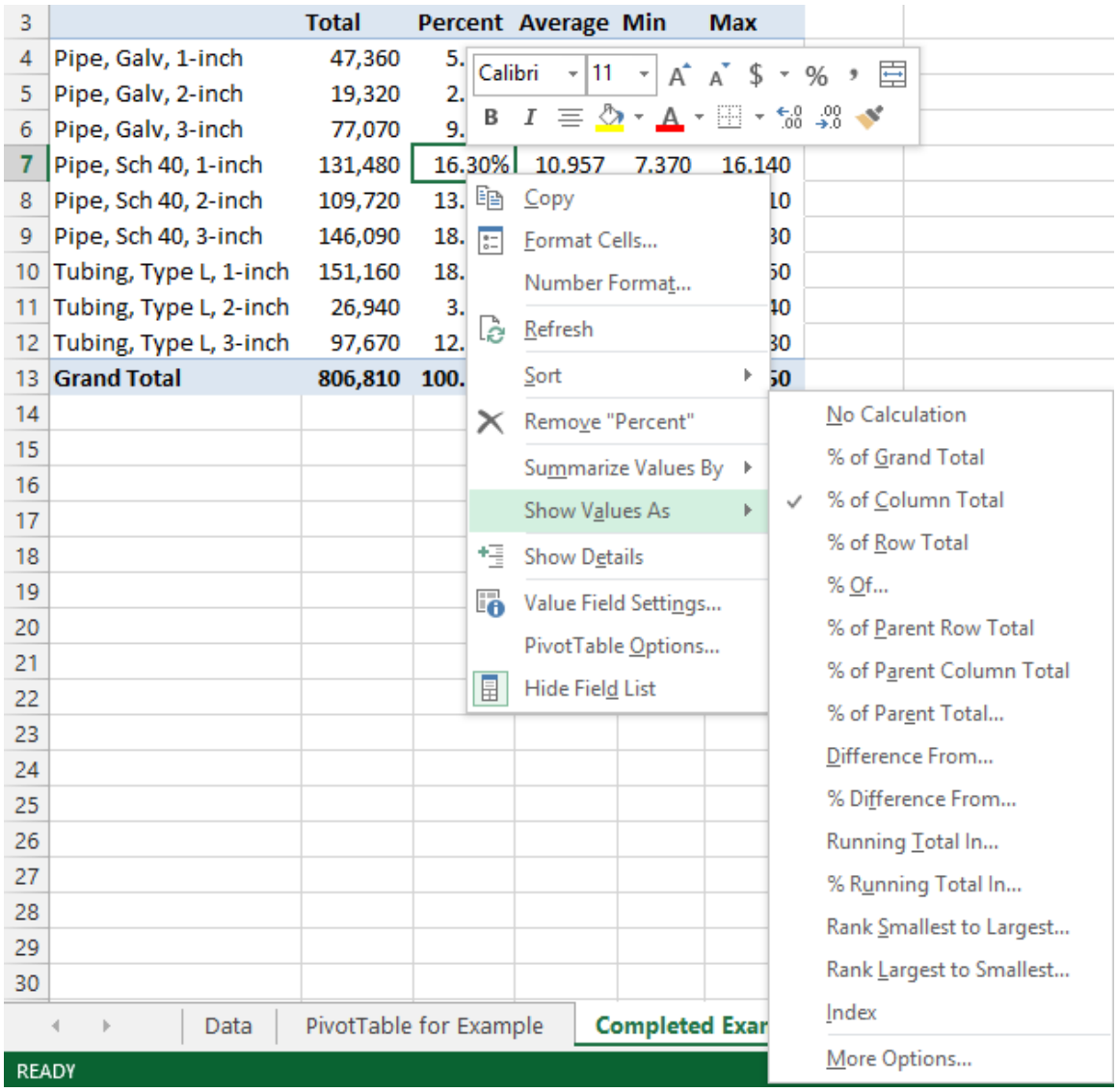

Figure 19 - Show Values as Option in Excel 2013

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Creating Calculated Items

In our first example, we will create a *calculated item* – the gross margin from the data within a simple consolidation PivotTable. Items are the data elements within a data field. In this example, we will add a calculated item – **GM** – to the consolidated PivotTable shown in **Figure 20**.

	A	B	C	D	M	N
1	Division	(All)				
2						
3	**Combined Budgets**	**Months**				
4	**Income Components**	**1/1/2012**	**2/1/2012**	**3/1/2012**	**12/1/2012**	**Grand Total**
5	Revenue	344,000	377,000	414,000	1,032,000	7,481,000
6	Cost of Sales	173,000	183,000	193,000	285,000	2,748,000
7	Distribution	35,000	45,000	55,000	148,000	1,095,000
8	Facilities	17,000	17,000	17,000	17,000	204,000
9	SG&A	35,000	45,000	55,000	148,000	1,095,000
10	Total Expense	87,000	107,000	127,000	313,000	2,394,000
11	Net Income	84,000	87,000	94,000	434,000	2,339,000
12	**Grand Total**	**775,000**	**861,000**	**955,000**	**2,377,000**	**17,356,000**

Figure 20 – Simple Consolidation PivotTable

To insert a calculated item, use the following procedure.

1. Position your cursor anywhere in the row item area beneath the field named **Income Components**.

2. In Excel 2013 or 2016, on the **PivotTable Tools, Analyze** contextual tab, click **Fields**, **Items, & Sets** followed by **Calculated Item** as shown in **Figure 21.** Alternatively, in Excel 2010, on the **PivotTable Tools, Options** contextual tab, click **Fields**, **Items, & Sets** followed by **Calculated Item**. In Excel 2007, on the **PivotTable Tools, Options** contextual tab, click **Formulas** followed by **Calculated Item**. Note that you can also create Calculate Fields through this command sequence, but that will be covered later in this chapter.

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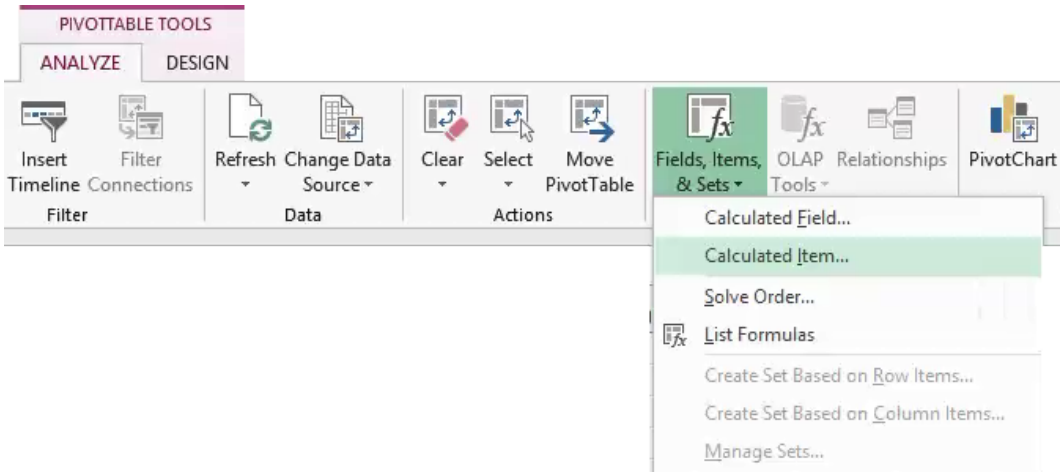

Figure 21 - Creating Formulas from the PivotTable Tools Tab in Excel 2013 or 2016

3. In the **Insert Calculated Item** dialog box, first enter a name for the new item in the **Name** box. Type in **GM**.

4. Now, let's build the formula. Position your cursor in the **Formula** box, click and highlight **Revenue** in the **Items** box in the lower right-hand corner, and then click **Insert Item**. Next, type in the minus sign (-) and then click and highlight **Cost of Sales** in the **Items** box. Click on **Insert Item** and then **OK** to complete the process as shown in **Figure 22**.

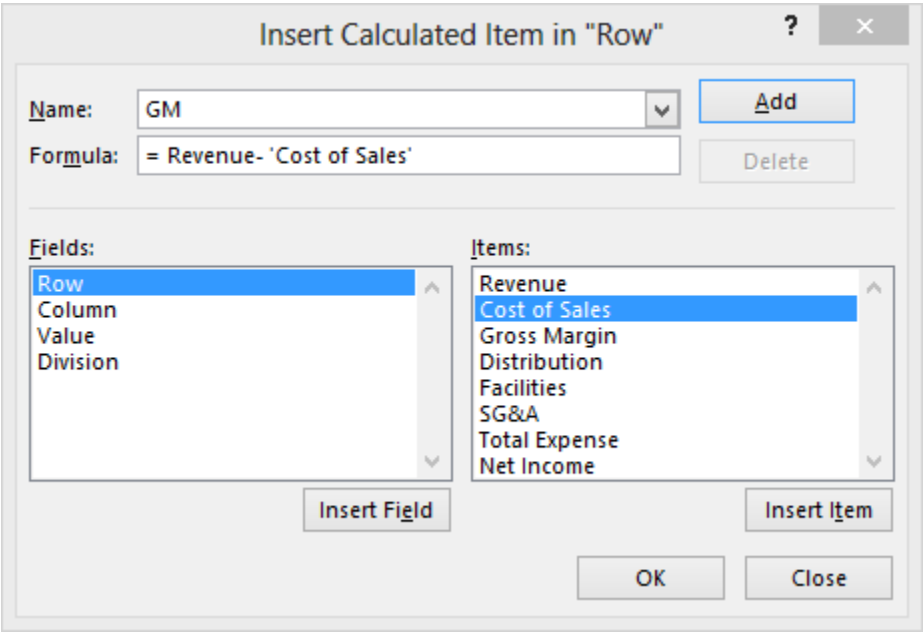

Figure 22 – Entering the Formula for a Calculated Item

5. The new item will be created at the bottom of the Income Components column. Use your mouse to drag the item to the correct position in the report.

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> Note that Excel will display an error message if you now attempt to group months into quarters in the PivotTable report because built-in date and number grouping is not allowed across calculated items in PivotTables.

To delete a calculated item, return to the **Insert Calculated Item** dialog box. Then, use the drop-down list to select the appropriate item in the **Name** box and click **Delete**.

Calculated Items can contain relative references to their underlying data in a PivotTable. For instance, suppose one wanted to use the prior months' data in a PivotTable to estimate future results. More specifically, someone preparing a forecast believes that sales for the current month can be estimated by averaging sales for the prior two months and multiplying that result by 150%. To use a Calculated Item to perform this calculation, click in the Months field of the PivotTable and click **Formulas** from the **PivotTable Tools, Analyze** contextual tab from the Ribbon and open the **Insert Calculated Item** dialog box. There, enter the name for the Calculated Item and the appropriate formula as shown in **Figure 23**.

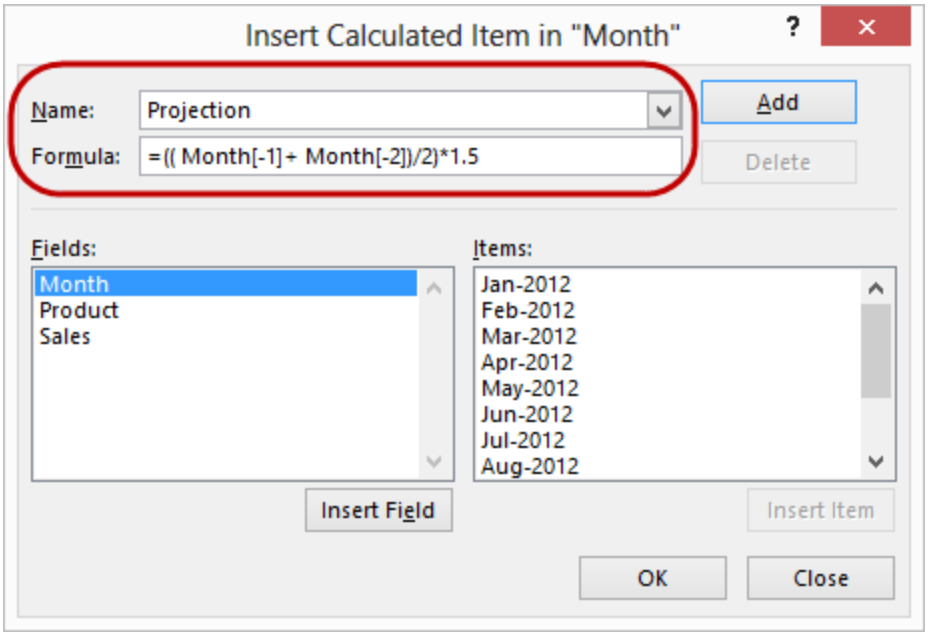

Figure 23 - Creating a Calculated Item

Note that upon creating a Calculated Item, it can be edited directly in the Formula Bar or PivotTable without returning to the Calculated Item dialog box. To do so, simply double-click in the PivotTable on the Calculated Item of interest, and it will open for editing as shown in **Figure 24**.

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SUM | =((Month[-1]+Month[-2])/2)*1.5

	A	B	C	D	E	F
1						
2						
3	**Sum of Sales**					
4		**Nov-2012**	**Dec-2012**	**Projection**	**Grand Total**	
5	Pipe, Galv, 1-inch	6,110	3,200	=((Month[-1]+Month[-2])/2)*1.5		
6	Pipe, Galv, 2-inch	370	240	458	1,068	
7	Pipe, Galv, 3-inch	5,090	310	4,050	9,450	
8	Pipe, Sch 40, 1-inch	16,140	8,380	18,390	42,910	
9	Pipe, Sch 40, 2-inch	10,610	5,220	11,873	27,703	
10	Pipe, Sch 40, 3-inch	17,930	9,310	20,430	47,670	
11	Tubing, Type L, 1-inch	21,050	11,170	24,165	56,385	
12	Tubing, Type L, 2-inch	3,840	2,050	4,418	10,308	
13	Tubing, Type L, 3-inch	9,150	4,470	10,215	23,835	
14	**Grand Total**	**90,290**	**44,350**	**100,980**	**235,620**	

Figure 24 - Editing a Calculated Item in a PivotTable

Creating Calculated Fields

In this example, we will be creating a simple PivotTable from a single table in Sage 100, the customer master file, **AR_Customer**. A connection to the external data source will be made using ODBC – Open Database Connectivity – an open standard for connecting applications to a database. Once the connection is made, users are presented with a list of tables which can be expanded to display the fields contained in each table. Expand the field list by clicking on the plus **(+)** sign to the left of the table name in the left-hand pane. Then, choose the fields that are to be displayed in the report and click on the **(>)** button to move them to the right-hand pane as shown below in **Figure 25.** Select the following fields: **CustomerNo**, **State**, **SalespersonNo**, **CurrentBalance**, **AgingCategory1**, **AgingCategory2**, **AgingCategory3**, and **Aging Category4**.

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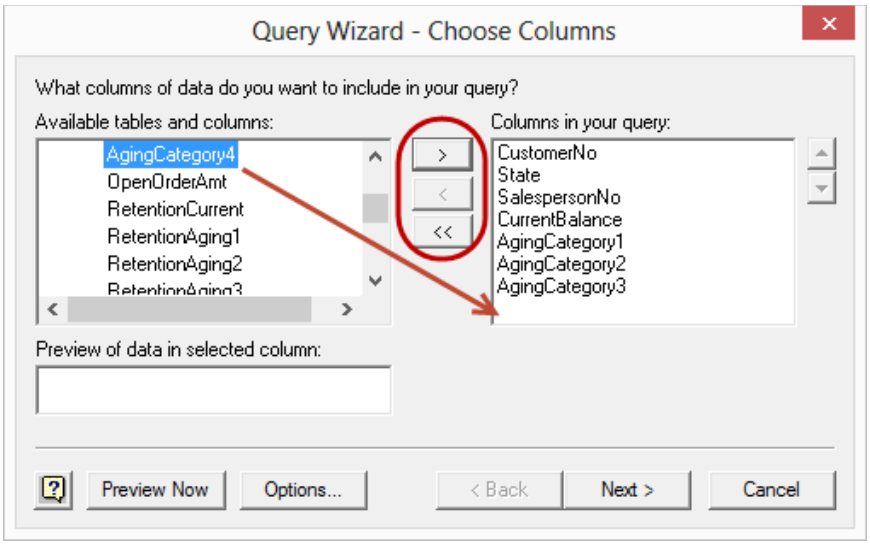

Figure 25 – Selecting the Fields for the Report

After the required fields are selected, click **Next** several times. In the **Query Wizard - Finish** pane, select **Return Data to Microsoft Office Excel** and click **Finish**. In the **Import Data** dialog box, select **PivotTable Report**, specify the location for the report, and then click **OK**. Next, drag-and-drop the fields to the appropriate report quadrants in the **PivotTable Task Pane**, rename and format the column labels, choose a number format for the data, and complete the PivotTable just as with any other. The major difference is that this PivotTable is dynamically linked to the underlying data in the General Ledger. If users need the same report next week or next month, all they need to do is retrieve the workbook, refresh the PivotTable, and print the updated report. The process to update and print the report takes seconds to complete. **Figure 26** illustrates creating the initial PivotTable.

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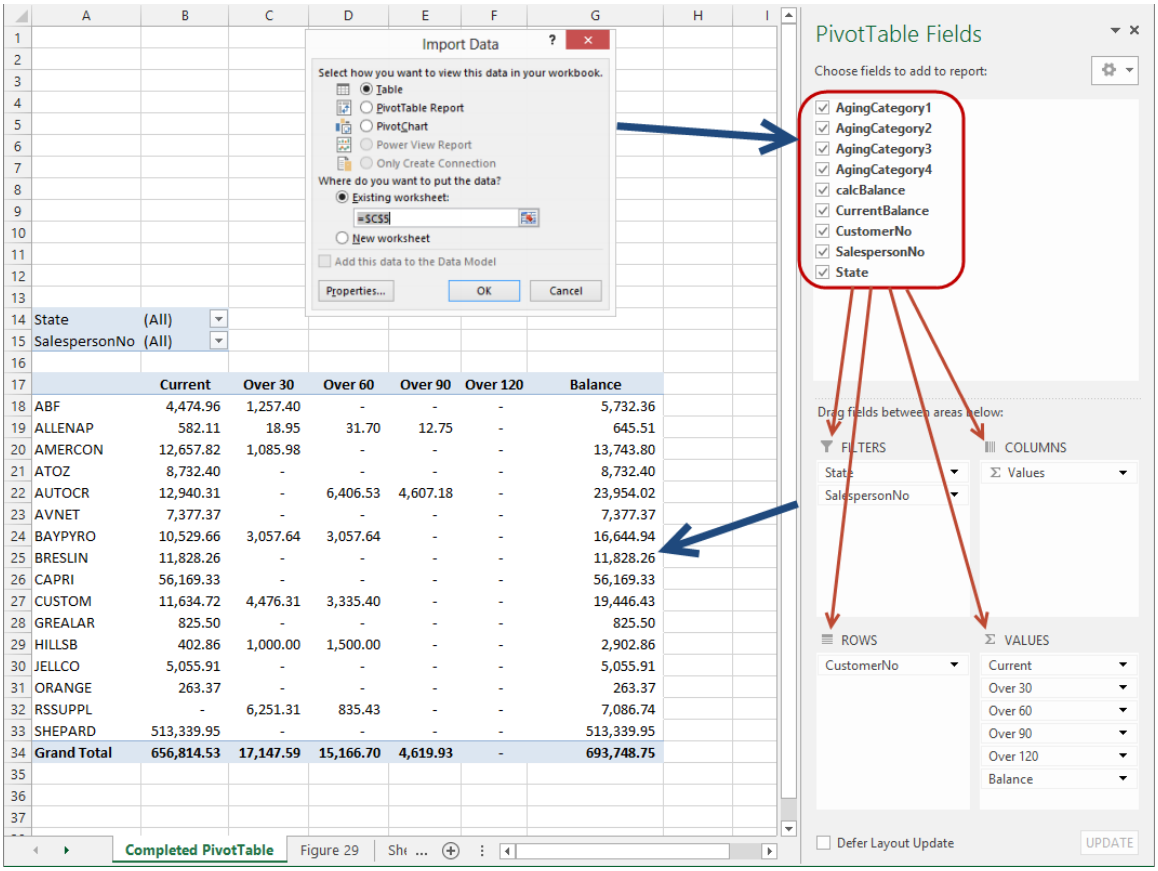

Figure 26 – Creating a PivotTable Connected to an External Data Source

Our initial PivotTable contains an accounts receivable aging report, but it does not contain a column for the total outstanding balances owed by our customers. To create a column for the outstanding balances, we will need to create a *calculated field*.

To insert a calculated field, follow the procedure described below.

1. Position the cursor anywhere in the **Over 120** column.

2. In Excel 2013 or later, on the **PivotTable Tools, Analyze** contextual tab, click **Fields, Items, & Sets** followed by **Calculated Field**. Alternatively, in Excel 2010, on the **PivotTable Tools, Options** contextual tab, click **Fields, Items, & Sets** followed by **Calculated Field**. In Excel 2007, on the **PivotTable Tools, Options** contextual tab, click **Formulas** followed by **Calculated Field**.

3. In the **Insert Calculated Field** dialog box, enter a name for the new item in the **Name** box. Type in **calcBalance**.

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4. Then, build the formula. Position the cursor in the **Formula** box, click and highlight **CurrentBalance** in the **Fields** box, and then click **Insert Field**. Next, type in the plus sign (+) and then click and highlight **AgingCategory1** in the **Fields** box. Again, click on **Insert Field**. Repeat this process until all fields through **AgingCategory4** are summed in the **Formula** box. Click **OK** to complete the process as shown in **Figure 27**.

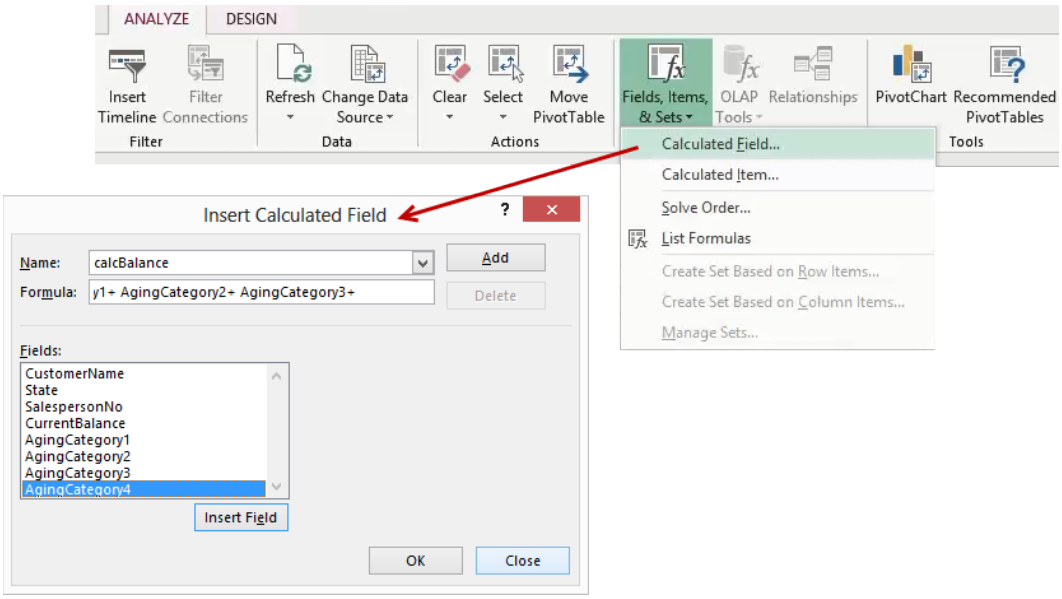

Figure 27 – Entering a Formula for a Calculated Field

5. The new field will be added as a column to the right of the **Over 120** column. Rename the field to **Balance**.

To complete the table, drag **SalespersonNo** to the **Rows** quadrant and drag the **CustomerName** field to the **Filters** quadrant. The reconfigured PivotTable helps users examine and understand the sales and collection performance of their sales staff. Similarly, we could have replaced **SalespersonNo** in the **Rows** quadrant with **State** to produce an aging of accounts by state, which could help users manage risk of non-collection in specific states. The completed PivotTable is shown in **Figure 28**.

	A	B	C	D	E	F	G
1	State	(All)					
2	CustomerName	(All)					
3							
4		Current	Over 30	Over 60	Over 90	Over 120	Balance
5	0100	$ 16,303.22	$ 1,257.40	$ -	$ -	$ -	$ 17,560.62
6	0200	$ 521,120.18	$ 7,251.31	$ 2,335.43	$ -	$ -	$ 530,706.92
7	0300	$ 30,719.81	$ 4,476.31	$ 9,741.93	$ 4,607.18	$ -	$ 49,545.23
8	0400	$ 88,671.32	$ 4,162.57	$ 3,089.34	$ 12.75	$ -	$ 95,935.98
9	**Grand Total**	**$ 656,814.53**	**$ 17,147.59**	**$ 15,166.70**	**$ 4,619.93**	**$ -**	**$ 693,748.75**

Figure 28 – Aging of Accounts Receivable by Salesperson

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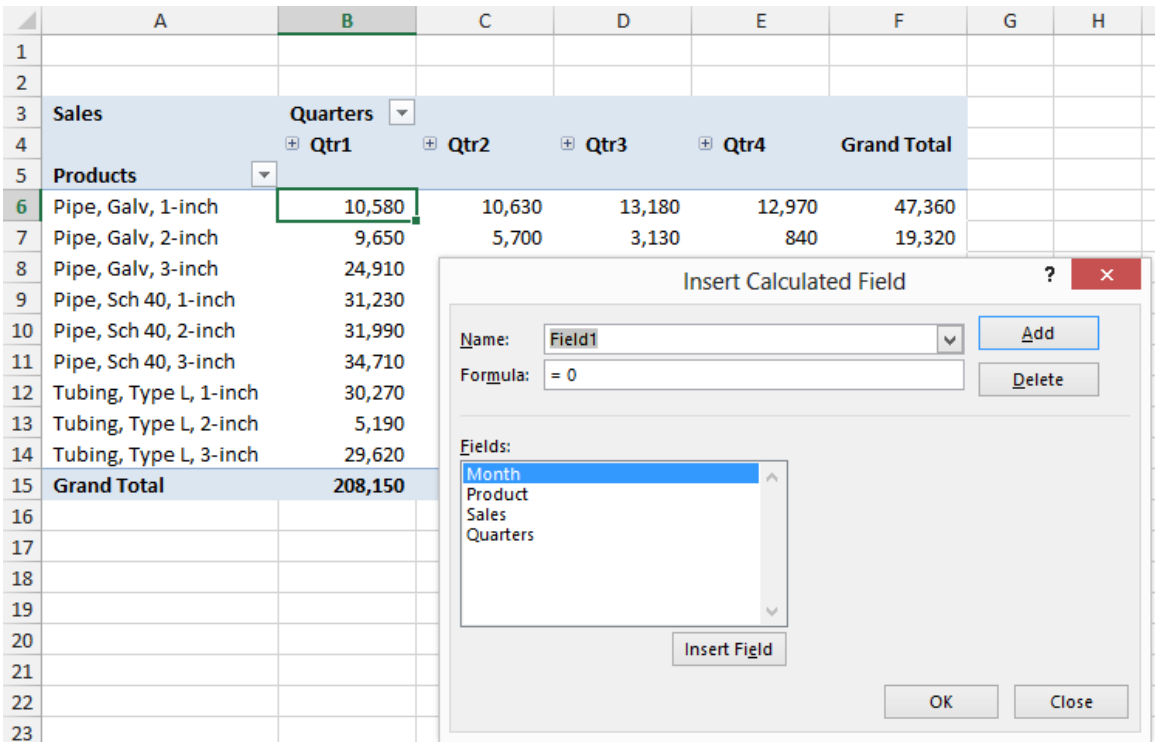
Remember, our PivotTable is dynamically linked to the underlying data in Sage 100. To use this report in the future, retrieve the workbook and click **Refresh** to produce an updated report based on the transactions and postings as they exist in Sage 100 at the time of refresh.

Difference From and % Difference From

The creation of calculated items and fields is a straightforward process. However, the ability to make calculations on grouped data is not intuitive for most users. For example, if we had grouped date data into quarters in a PivotTable and then wanted to calculate the dollar or percentage differences in sales between quarters, using a calculated field to compute the difference would seem to be the appropriate course of action. The problem is that quarterly summaries that result from grouping operations are *not* items or fields and do not appear in the field list box as separate elements that can be included in a calculation. **Figure 29** displays a simple PivotTable with date data grouped as Quarters. Note, however, that while **Quarters** appears as a field in the **Insert Calculated Field** dialog box, **Qtr1**, **Qtr2**, **Qtr3**, and **Qtr4** do not. If a user wanted to calculate the difference in sales between quarters three and four, a calculated field could not be used to compute the change.



Sales	Quarters				
	Qtr1	Qtr2	Qtr3	Qtr4	Grand Total
Products					
Pipe, Galv, 1-inch	10,580	10,630	13,180	12,970	47,360
Pipe, Galv, 2-inch	9,650	5,700	3,130	840	19,320
Pipe, Galv, 3-inch	24,910				
Pipe, Sch 40, 1-inch	31,230				
Pipe, Sch 40, 2-inch	31,990				
Pipe, Sch 40, 3-inch	34,710				
Tubing, Type L, 1-inch	30,270				
Tubing, Type L, 2-inch	5,190				
Tubing, Type L, 3-inch	29,620				
Grand Total	208,150				

Figure 29 – Grouping Data Does Not Create Fields

Creating the desired calculations is an entirely unintuitive process. First, let's filter the PivotTable report so that only quarters three and four are displayed on the report. Click the drop-down arrow just to the right of the **Quarters** button. Uncheck **Show All**; then check **Qtr3** and **Qtr4** and **OK**. If the **PivotTable Fields** pane is not open, click the **Field List** button in the **Show** group of the **PivotTable Analyze** tab on the Ribbon. Drag the **Sales** field to the **Values** quadrant *two* times. On the **PivotTable Design** tab on the Ribbon in the **Layout** group, select **Grand Totals** to list options. Select **On for Columns Only** to produce a PivotTable that resembles the one in **Figure 30**.

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	Quarters					
	⊞ Qtr3			⊞ Qtr4		
Products	Sales	Sum of Sales	Sum of Sales2	Sales	Sum of Sales	Sum of Sales2
Pipe, Galv, 1-inch	13,180	13,180	13,180	12,970	12,970	12,970
Pipe, Galv, 2-inch	3,130	3,130	3,130	840	840	840
Pipe, Galv, 3-inch	24,450	24,450	24,450	9,290	9,290	9,290
Pipe, Sch 40, 1-inch	35,940	35,940	35,940	34,260	34,260	34,260
Pipe, Sch 40, 2-inch	27,880	27,880	27,880	22,590	22,590	22,590
Pipe, Sch 40, 3-inch	39,930	39,930	39,930	38,060	38,060	38,060
Tubing, Type L, 1-inch	43,310	43,310	43,310	44,620	44,620	44,620
Tubing, Type L, 2-inch	7,790	7,790	7,790	8,140	8,140	8,140
Tubing, Type L, 3-inch	24,410	24,410	24,410	19,490	19,490	19,490
Grand Total	**220,020**	**220,020**	**220,020**	**190,260**	**190,260**	**190,260**

Figure 30 – Rearranged PivotTable with Three Sales Columns per Quarter

Note that the two **Sales** columns act as a single object, as do the **Sum of Sales** columns and the **Sum of Sales2** columns. Any action taken on one column of each pair is replicated on the other. No action can be taken on the **Sales** column in Qtr3 without the same action being automatically applied to the **Sales** column in Qtr4.

Right-click on the **Sum of Sales** column in **Qtr3** and choose **Value Field Settings** from the context-sensitive menu. On the **Show Values As** tab, select **Difference From** in the drop down list. Select **Quarters** in the **Base field** box in the lower left-hand corner of the dialog box. Then, select **(previous)** in the **Base item** box in the lower right-hand corner of the dialog box and click **OK**. The PivotTable now contains a difference column with blanks in the Qtr3 column and amounts in the Qtr4 column. Repeat the process on **Sum of Sales 2**, except choose **% Difference From** on the **Show values as** tab. The PivotTable now contains a percentage difference column with blanks in the Qtr3 column and percentages in the Qtr4 column. The PivotTable should resemble the one displayed in **Figure 31**.

	Quarters					
	⊞ Qtr3			⊞ Qtr4		
Products	Sales	Sum of Sales	Sum of Sales2	Sales	Sum of Sales	Sum of Sales2
Pipe, Galv, 1-inch	13,180			12,970	(210)	-1.59%
Pipe, Galv, 2-inch	3,130			840	(2,290)	-73.16%
Pipe, Galv, 3-inch	24,450			9,290	(15,160)	-62.00%
Pipe, Sch 40, 1-inch	35,940			34,260	(1,680)	-4.67%
Pipe, Sch 40, 2-inch	27,880			22,590	(5,290)	-18.97%
Pipe, Sch 40, 3-inch	39,930			38,060	(1,870)	-4.68%
Tubing, Type L, 1-inch	43,310			44,620	1,310	3.02%
Tubing, Type L, 2-inch	7,790			8,140	350	4.49%
Tubing, Type L, 3-inch	24,410			19,490	(4,920)	-20.16%
Grand Total	**220,020**			**190,260**	**(29,760)**	**-13.53%**

Figure 31 – PivotTable with Calculated Quarterly Differences

> As described previously in this chapter, the **Value Field Settings** dialog box can be accessed by selecting the **Field Settings** icon on the **Analyze** tab of the Ribbon in Excel 2013 or newer. Additionally, these options can be accessed by right-clicking in the data area of a PivotTable and choosing **Value Field Settings**.

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Now, we need to clean up the PivotTable for presentation. Rename **Sum of Sales** to **Δ$** and **Sum of Sales 2** to **Δ%** by typing over the existing labels. Select the cell with the label **Sum of Sales**. To enter the **Δ** symbol, select **Symbol** on the right side of the **Insert** tab of the Ribbon to open the **Symbol** dialog box. Navigate to the **delta** (change) symbol (Font normal text and Subset Mathematical Operators) and select **Insert** and **Close**. Format the **Sales** and **Δ$** columns as accounting with no decimals and no dollar signs. Use a custom number format, if desired, for the **Δ%** column. Boldface and center the column labels. Group the products into product groups and enable **automatic** subtotaling for the product group field. Hide the blank columns for Qtr3 at the worksheet level. If the blank columns are hidden at the PivotTable level, both *pairs* of columns will be hidden, thereby yielding a report with only two columns, quarterly sales for **Qtr3** and quarterly sales for **Qtr4**. Select columns **C** and **D** in the *worksheet*, right-click, and choose **Hide**. Then, apply a predefined style from the **PivotTable Styles** gallery. The completed PivotTable should resemble the one displayed in **Figure 32**.

	Qtr3 Sales	Qtr4 Sales	Δ$	Δ%
⊟ **Galv**				
Pipe, Galv, 1-inch	13,180	12,970	(210)	-1.59%
Pipe, Galv, 2-inch	3,130	840	(2,290)	-73.16%
Pipe, Galv, 3-inch	24,450	9,290	(15,160)	-62.00%
Galv Total	**40,760**	**23,100**	**(17,660)**	**-43.33%**
⊟ **Sch 40**				
Pipe, Sch 40, 1-inch	35,940	34,260	(1,680)	-4.67%
Pipe, Sch 40, 2-inch	27,880	22,590	(5,290)	-18.97%
Pipe, Sch 40, 3-inch	39,930	38,060	(1,870)	-4.68%
Sch 40 Total	**103,750**	**94,910**	**(8,840)**	**-8.52%**
⊟ **Tubing**				
Tubing, Type L, 1-inch	43,310	44,620	1,310	3.02%
Tubing, Type L, 2-inch	7,790	8,140	350	4.49%
Tubing, Type L, 3-inch	24,410	19,490	(4,920)	-20.16%
Tubing Total	**75,510**	**72,250**	**(3,260)**	**-4.32%**
Grand Total	**220,020**	**190,260**	**(29,760)**	**-13.53%**

Figure 32 – Completed PivotTable that Calculates Between Quarter Differences

Percentage Options in Excel 2010 and newer

Significant additions to Excel 2010 and carried forward to the 2013 and 2016 versions include the ability to change how percentage calculations display in PivotTables. More specifically, users now have the options of showing data as a percentage of the parent row total, percentage of the parent column total, and percentage of parent total.

To illustrate, consider the example presented in **Figure 33**; it shows percentages for each item computed as a percentage of that item relative to the total for the group to which the item belongs. Further, the total for each item group is expressed as a percentage of that total relative to the total of all item groups.

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This view is known as **Percent of Parent Row Total** and is accessible from the **Show values as** options in Excel 2010 and 2013.

	Qtr3		Qtr4	
	Sales	Percentage	Sales	Percentage
⊟ **Galv**				
Pipe, Galv, 1-inch	13,180	32.34%	12,970	56.15%
Pipe, Galv, 2-inch	3,130	7.68%	840	3.64%
Pipe, Galv, 3-inch	24,450	59.99%	9,290	40.22%
Galv Total	**40,760**	**18.53%**	**23,100**	**12.14%**
⊟ **Sch 40**				
Pipe, Sch 40, 1-inch	35,940	34.64%	34,260	36.10%
Pipe, Sch 40, 2-inch	27,880	26.87%	22,590	23.80%
Pipe, Sch 40, 3-inch	39,930	38.49%	38,060	40.10%
Sch 40 Total	**103,750**	**47.15%**	**94,910**	**49.88%**
⊟ **Tubing**				
Tubing, Type L, 1-inch	43,310	57.36%	44,620	61.76%
Tubing, Type L, 2-inch	7,790	10.32%	8,140	11.27%
Tubing, Type L, 3-inch	24,410	32.33%	19,490	26.98%
Tubing Total	**75,510**	**34.32%**	**72,250**	**37.97%**
Grand Total	**220,020**	**100.00%**	**190,260**	**100.00%**

Figure 33 - Excel's Percent of Parent Row Total in a PivotTable

The PivotTable shown in **Figure 34** calculates percentages based on the relative amount of an item compared to the total for that item's group. The totals for each group are not expressed as relative totals compared to all groups. This view is known as **Percent of Parent Total**.

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	Qtr3		Qtr4	
	Sales	Percentage	Sales	Percentage
⊟ **Galv**				
Pipe, Galv, 1-inch	13,180	32.34%	12,970	56.15%
Pipe, Galv, 2-inch	3,130	7.68%	840	3.64%
Pipe, Galv, 3-inch	24,450	59.99%	9,290	40.22%
Galv Total	**40,760**	**100.00%**	**23,100**	**100.00%**
⊟ **Sch 40**				
Pipe, Sch 40, 1-inch	35,940	34.64%	34,260	36.10%
Pipe, Sch 40, 2-inch	27,880	26.87%	22,590	23.80%
Pipe, Sch 40, 3-inch	39,930	38.49%	38,060	40.10%
Sch 40 Total	**103,750**	**100.00%**	**94,910**	**100.00%**
⊟ **Tubing**				
Tubing, Type L, 1-inch	43,310	57.36%	44,620	61.76%
Tubing, Type L, 2-inch	7,790	10.32%	8,140	11.27%
Tubing, Type L, 3-inch	24,410	32.33%	19,490	26.98%
Tubing Total	**75,510**	**100.00%**	**72,250**	**100.00%**
Grand Total	**220,020**		**190,260**	

Figure 34 – Excel's Percent of Parent Total in a PivotTable

Lastly, the PivotTable shown in **Figure 35** shows the percentages for each column of each item calculated as that item, relative to the total for all columns of data for that item. Likewise, the total for each item group is expressed as the relative percentage of the value for that group relative to the total of all columns of data for that group. This view is known as **Percent of Parent Column Total**.

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	Qtr3		Qtr4	
	Sales	Percentage	Sales	Percentage
⊟ Galv				
Pipe, Galv, 1-inch	13,180	50.40%	12,970	49.60%
Pipe, Galv, 2-inch	3,130	78.84%	840	21.16%
Pipe, Galv, 3-inch	24,450	72.47%	9,290	27.53%
Galv Total	**40,760**	**63.83%**	**23,100**	**36.17%**
⊟ Sch 40				
Pipe, Sch 40, 1-inch	35,940	51.20%	34,260	48.80%
Pipe, Sch 40, 2-inch	27,880	55.24%	22,590	44.76%
Pipe, Sch 40, 3-inch	39,930	51.20%	38,060	48.80%
Sch 40 Total	**103,750**	**52.22%**	**94,910**	**47.78%**
⊟ Tubing				
Tubing, Type L, 1-inch	43,310	49.26%	44,620	50.74%
Tubing, Type L, 2-inch	7,790	48.90%	8,140	51.10%
Tubing, Type L, 3-inch	24,410	55.60%	19,490	44.40%
Tubing Total	**75,510**	**51.10%**	**72,250**	**48.90%**
Grand Total	**220,020**	**53.63%**	**190,260**	**46.37%**

Figure 35 - Excel's Percent of Parent Column Total in a PivotTable

Running Totals

In this example, a sales manager would like a report that displays sales in units by product within quarters in one set of columns and year-to-date sales by products within quarters in another. First, produce a simple PivotTable report with sales in date columns grouped by quarters. Next, add **Sales** to the **Values** quadrant a second time. Rename **Months** to **Quarters**, **Sum of Sales** to **Unit Sales**, and **Sum of Sales 2** to **YTD Units**. Uncheck **Show grand totals for rows** and **Autofit column widths on update** in **PivotTable Options**. Format the table data as accounting with no decimals and no dollar signs. Now, right-click on one of the column labels for **YTD Units** and choose **Value Field Settings**. On the **Show values as** tab, select **Running Total in**. Select **Quarters** in the **Base field** box in the lower left-hand corner of the dialog box and click **OK**. Hide the **YTD Units** column for **Qtr1** and then apply a predefined style from the **PivotTable Styles** gallery. The completed PivotTable should resemble the one displayed in **Figure 36**.

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	Qtr1	Qtr2		Qtr3		Qtr4	
	Sales Units	Sales Units	YTD Units	Sales Units	YTD Units	Sales Units	YTD Units
Pipe, Galv, 1-inch	10,580	10,630	21,210	13,180	34,390	12,970	47,360
Pipe, Galv, 2-inch	9,650	5,700	15,350	3,130	18,480	840	19,320
Pipe, Galv, 3-inch	24,910	18,420	43,330	24,450	67,780	9,290	77,070
Pipe, Sch 40, 1-inch	31,230	30,050	61,280	35,940	97,220	34,260	131,480
Pipe, Sch 40, 2-inch	31,990	27,260	59,250	27,880	87,130	22,590	109,720
Pipe, Sch 40, 3-inch	34,710	33,390	68,100	39,930	108,030	38,060	146,090
Tubing, Type L, 1-inch	30,270	32,960	63,230	43,310	106,540	44,620	151,160
Tubing, Type L, 2-inch	5,190	5,820	11,010	7,790	18,800	8,140	26,940
Tubing, Type L, 3-inch	29,620	24,150	53,770	24,410	78,180	19,490	97,670
Grand Total	**208,150**	**188,380**	**396,530**	**220,020**	**616,550**	**190,260**	**806,810**

Figure 36 – PivotTable with Running Totals for YTD Sales

Calculating Variances

A common question asked of our instructors is how to calculate variances within a PivotTable. Assuming that the budget data is available for each of the detail items contained in the data source, calculation of the variances is accomplished using a simple calculated field. Let's assume that the report needs to produce quarterly variances. First, create a simple PivotTable report with unit sales and budgeted units within date columns grouped by quarters.

To insert a calculated field, do the following.

1. Position your cursor anywhere in the data area of the initial PivotTable.

2. In Excel 2013 or 2016, on the **PivotTable Tools, Analyze** contextual tab, click **Fields**, **Items, & Sets** followed by **Calculated Field**. Alternatively, in Excel 2010, on the **PivotTable Tools, Options** contextual tab, click **Fields**, **Items, & Sets** followed by **Calculated Field**. In Excel 2007, on the **PivotTable Tools, Options** contextual tab, click **Formulas** followed by **Calculated Field**.

3. In the **Insert Calculated Field** dialog box, enter a name for the new item in the **Name** box. Type in **calcVariance**.

4. Now, let's build the formula. Position your cursor in the **Formula** box, click and highlight **Unit Sales** in the **Fields** box, and then click **Insert Field**. Next, type in the minus sign **(-)**. Click and highlight **Budgeted Units** in the **Fields** box. Again, click on **Insert Field**. Click **OK** to complete the process as shown in **Figure 37**.

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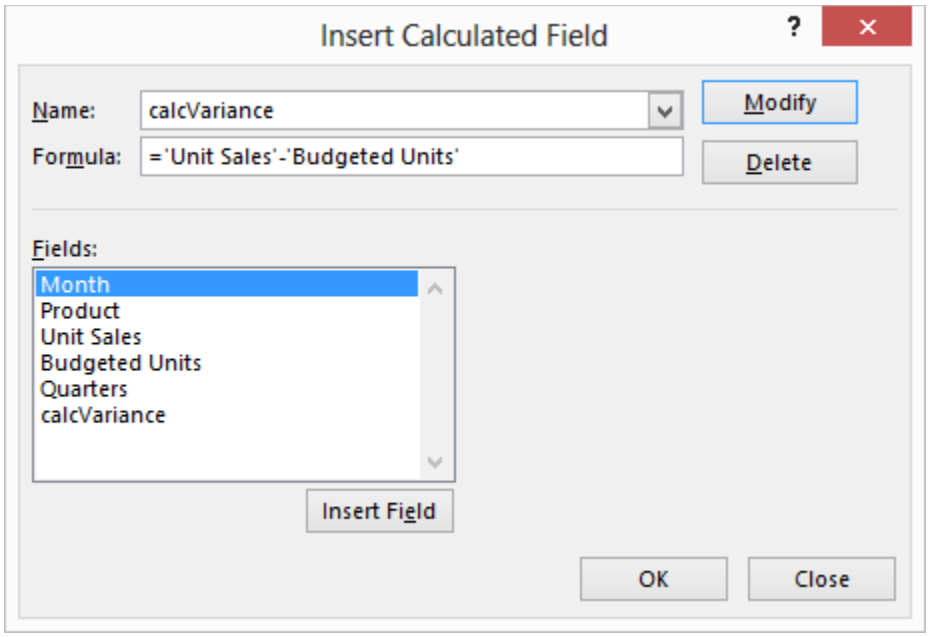

Figure 37 – Entering the Formula for a Calculated Item

5. The new field will be added as a new column in the data area. Reposition the column to the right of **Budgeted Units** and rename the field to **Variance**.

Complete the PivotTable by relabeling fields and reformatting the report as required for presentation. Note that in the sample report presented in **Figure 38,** the first and second quarters are filtered out for presentation.

	Qtr3			Qtr4			Total Sales Units	Total Budget Units	Total Variance
	Sales Units	Budget Units	Variance	Sales Units	Budget Units	Variance			
Pipe, Galv, 1-inch	540	529	11	630	610	20	1,170	1,139	31
Pipe, Galv, 2-inch	1,680	1,713	(33)	1,500	1,542	(42)	3,180	3,255	(75)
Pipe, Galv, 3-inch	3,000	3,108	(108)	3,450	3,554	(104)	6,450	6,662	(212)
Pipe, Sch 40, 1-inch	210	202	8	65	62	3	275	264	11
Pipe, Sch 40, 2-inch	1,736	1,759	(23)	657	662	(5)	2,393	2,421	(28)
Pipe, Sch 40, 3-inch	912	930	(18)	1,002	1,004	(2)	1,914	1,934	(20)
Tubing, Type L, 1-inch	1,920	1,995	(75)	1,740	1,788	(48)	3,660	3,783	(123)
Tubing, Type L, 2-inch	2,760	2,834	(74)	2,940	3,028	(88)	5,700	5,862	(162)
Grand Total	**12,758**	**13,070**	**(312)**	**11,984**	**12,250**	**(266)**	**24,742**	**25,320**	**(578)**

Figure 38 – Using a PivotTable to Calculate Variances

Percent Contribution to Total

Our last example computes sales of each product by month for the fourth quarter as a percentage of total sales for all products for the fourth quarter. This is a simple PivotTable with data summarized using a custom calculation. Create the initial PivotTable. Click the drop-down arrow just to the right of the **Column Labels** button and deselect all months but Oct, Nov, and Dec. Right-click on the **Sum of Sales** label and select **Show Values As**. On the list of total options, select **% of Grand Total**.

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Alternatively, users of Excel 2010 can select **Show Values As** from the **PivotTable Tools, Options** contextual tab. Format the report as required. The process for creating the report is illustrated in **Figure 39**.

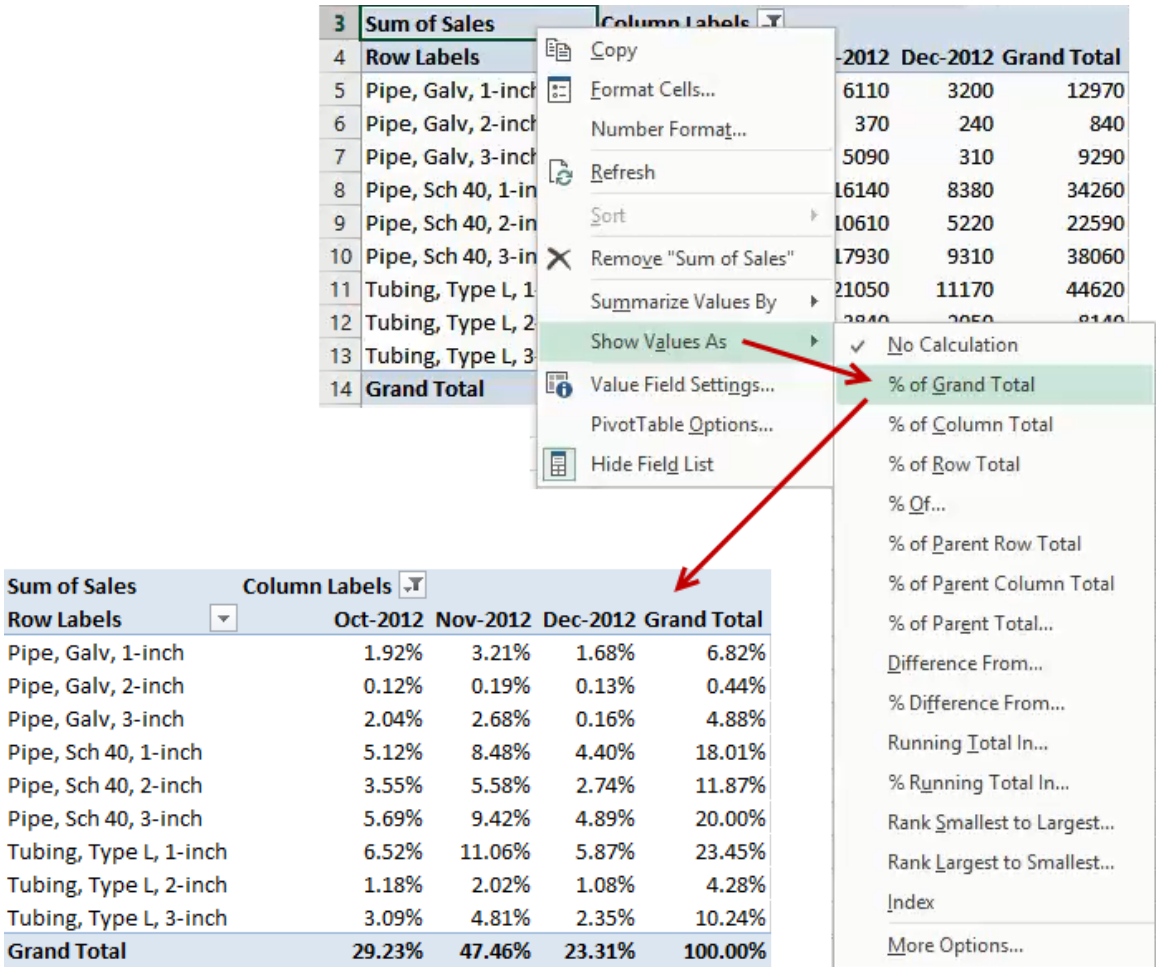

Figure 39 – Percent of Contribution PivotTable

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Chapter

3

Consolidating Data with PivotTables

Consolidation PivotTables are used to report data that is already tabulated. For example, if a user wanted to combine divisional or departmental income statements or product line, business line, or channel profitability reports, consolidation PivotTables can be used to produce the combined reports. The only requirement is that the data layout of the individual worksheets to be consolidated is similar, but they need *not* be identical.

Learning Objectives

Upon completing this chapter, participants should be able to:

- Identify the steps necessary to prepare Excel for consolidating data with PivotTables;
- Create simple consolidating PivotTables;
- Create calculated items in a consolidated PivotTable;
- Describe how to prepare consolidated PivotTables from non-identical data ranges; and
- Discuss the impact of Report Filters on consolidated PivotTables and the two options for creating Report Filters.

Preparing to Consolidate

An icon for Consolidation PivotTables is *not* available from the ribbon. Users must add the **PivotTable and PivotChart Wizard** icon to the **Quick Access Toolbar** (QAT) in Excel 2007/2010/2013/2016 or to the Ribbon in Excel 2010 and later to access this functionality.

In the following example, product line income statements will be combined into a single report with all of the reporting flexibility of a PivotTable. A sample of the data, which has an identical table for each of three product lines, is shown in **Figure 40**.

	A	B	C	D	E	F	G	H	I	J	K	L	M
1	DNM Distribution Company												
2	Comparative Budgeted Monthly Income Statements												
3													
4	Creams												
5		Jan-2012	Feb-2012	Mar-2012	Apr-2012	May-2012	Jun-2012	Jul-2012	Aug-2012	Sep-2012	Oct-2012	Nov-2012	Dec-2012
6	Revenue	100,000	115,000	132,000	152,000	175,000	201,000	231,000	266,000	306,000	352,000	405,000	466,000
7	Cost of Sales	50,000	53,000	56,000	59,000	62,000	65,000	68,000	71,000	74,000	77,000	80,000	83,000
8	Gross Margin	50,000	62,000	76,000	93,000	113,000	136,000	163,000	195,000	232,000	275,000	325,000	383,000
9	Distribution	10,000	13,000	16,000	19,000	22,000	25,000	28,000	31,000	34,000	37,000	40,000	43,000
10	SG&A	10,000	13,000	16,000	19,000	22,000	25,000	28,000	31,000	34,000	37,000	40,000	43,000
11	Facilities	5,000	5,000	5,000	5,000	5,000	5,000	5,000	5,000	5,000	5,000	5,000	5,000
12	Total Expense	25,000	31,000	37,000	43,000	49,000	55,000	61,000	67,000	73,000	79,000	85,000	91,000
13	Net Income	25,000	31,000	39,000	50,000	64,000	81,000	102,000	128,000	159,000	196,000	240,000	292,000

Figure 40 - Data to be Summarized Using a Consolidation PivotTable

Simple Consolidating PivotTables

In the first dialog box of the PivotTable Wizard, choose **Multiple consolidation ranges**. Click **Next**. Then, select how the Page fields are to be created. To insure maximum reporting flexibility, choose **I will create the page fields** and then click **Next**. The dialog box for the next step in the wizard appears as shown in **Figure 41**. Now, each of the data ranges in the single page field to be created must be defined, one range for each of the three product lines – Creams, Lotions, and Scrubs.

In our example, all of the ranges to be consolidated are on separate worksheets in a single workbook, but the data ranges can be consolidated from multiple workbooks. To consolidate ranges from multiple workbooks, simply open the other workbooks and point to the data ranges during the PivotTable creation process. Alternatively, type in the data ranges using the following format.

[workbook name] sheet name! range

Make sure to include the brackets around the workbook name and the exclamation point between the sheet name and the range specification. Using defined names to define the data ranges in the individual workbooks will make the task easier and less prone to error.

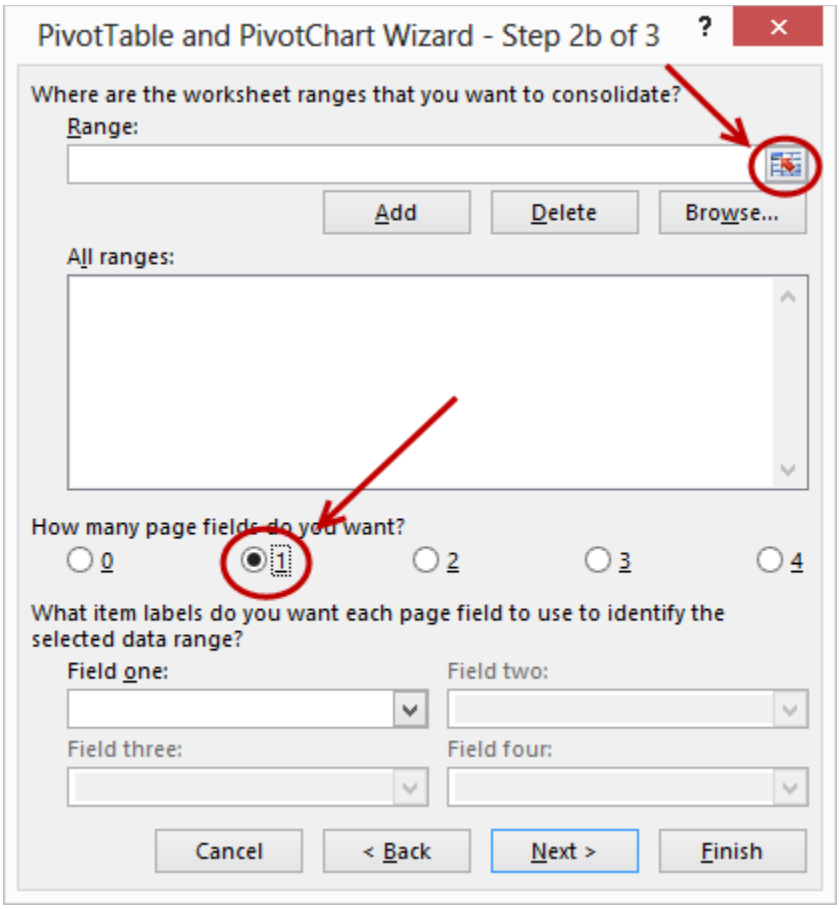

Figure 41 - Using the Collapse Dialog Button When Highlighting Ranges

Click on the **Collapse Dialog** button, shown in **Figure 41** at the right end of the **Range** box, to hide temporarily the dialog box. Then, using the mouse, highlight the range to be included in the report and click on the **Collapse Dialog** button to redisplay the dialog box. Click **Add** to add the range to the report. In the **Field one** box, enter the item name. Each of the ranges added in the dialog box will have its own item name – in this example, Creams, Lotions, and Scrubs. The completed dialog appears in **Figure 42**.

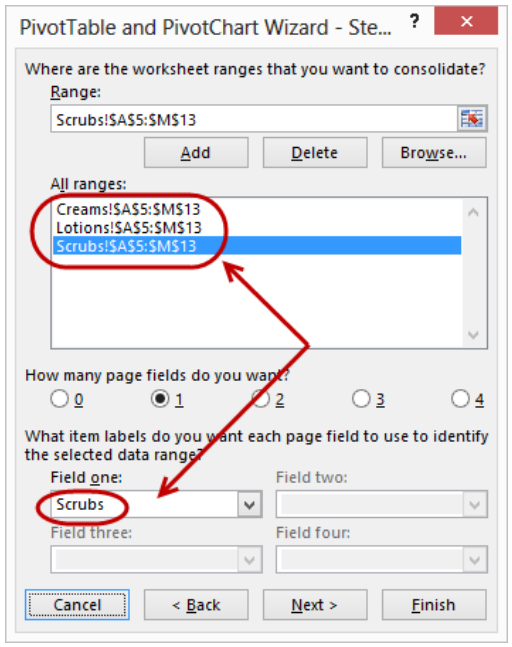

Figure 42 - Naming Each Field as the Field Range is Added

Click **Next**. Choose to create the PivotTable on a new worksheet and then click **Finish**. After grouping Months into Quarters and making some minor formatting changes, the initial PivotTable should resemble the one shown in **Figure 43**.

The items in the report are no longer in income statement order but are in alphabetical order.

	A	B	C	D	E	F
1	Page1	(All)				
2						
3	**Sum of Value**					
4		**Qtr1**	**Qtr2**	**Qtr3**	**Qtr4**	**Grand Total**
5	Cost of Sales	549,000	641,000	733,000	825,000	2,748,000
6	Distribution	135,000	227,000	319,000	414,000	1,095,000
7	Facilities	51,000	51,000	51,000	51,000	204,000
8	Gross Margin	586,000	870,000	1,309,000	1,968,000	4,733,000
9	Net Income	265,000	365,000	620,000	1,089,000	2,339,000
10	Revenue	1,135,000	1,511,000	2,042,000	2,793,000	7,481,000
11	SG&A	135,000	227,000	319,000	414,000	1,095,000
12	Total Expense	321,000	505,000	689,000	879,000	2,394,000
13	**Grand Total**	**3,177,000**	**4,397,000**	**6,082,000**	**8,433,000**	**22,089,000**

Figure 43 - Initial Consolidation PivotTable Created from Product Data

Rearranging Items

Notice that the items in the Row item area, the income statement components, have been rearranged in alphabetical order. Click and drag the edge of each item until the order of the items is in income statement order. Click on an item to be moved and hover the cursor over the top or bottom edge of the cell so that the mouse pointer turns into a compass rose as shown in **Figure 44**. Click and hold the left mouse button and drag the item to the desired position in the list, releasing the mouse button to drop the item in place.

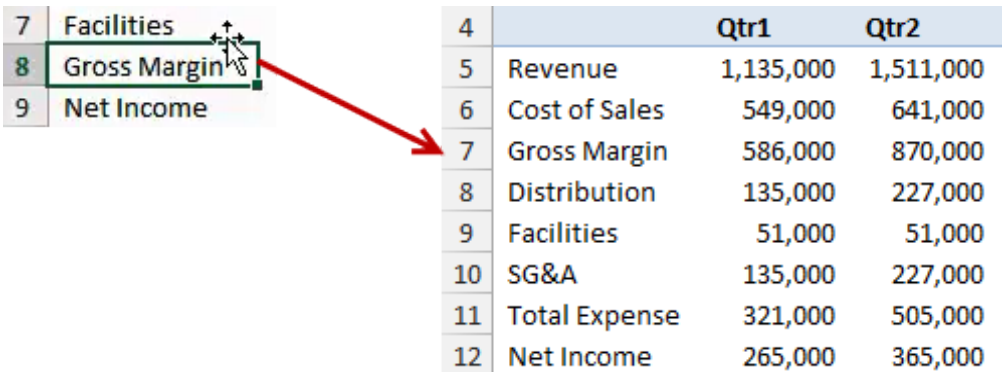

Figure 44 - Dragging Row Items into the Proper Order

Removing Meaningless Totals

The Grand Total created initially at the bottom of the report is meaningless because it adds together all of the income statement components. To remove the total, click **Grand Totals** on the **PivotTable Tools, Design** contextual tab and select **On for Rows Only**, leaving only the total for the rows as shown in **Figure 45**.

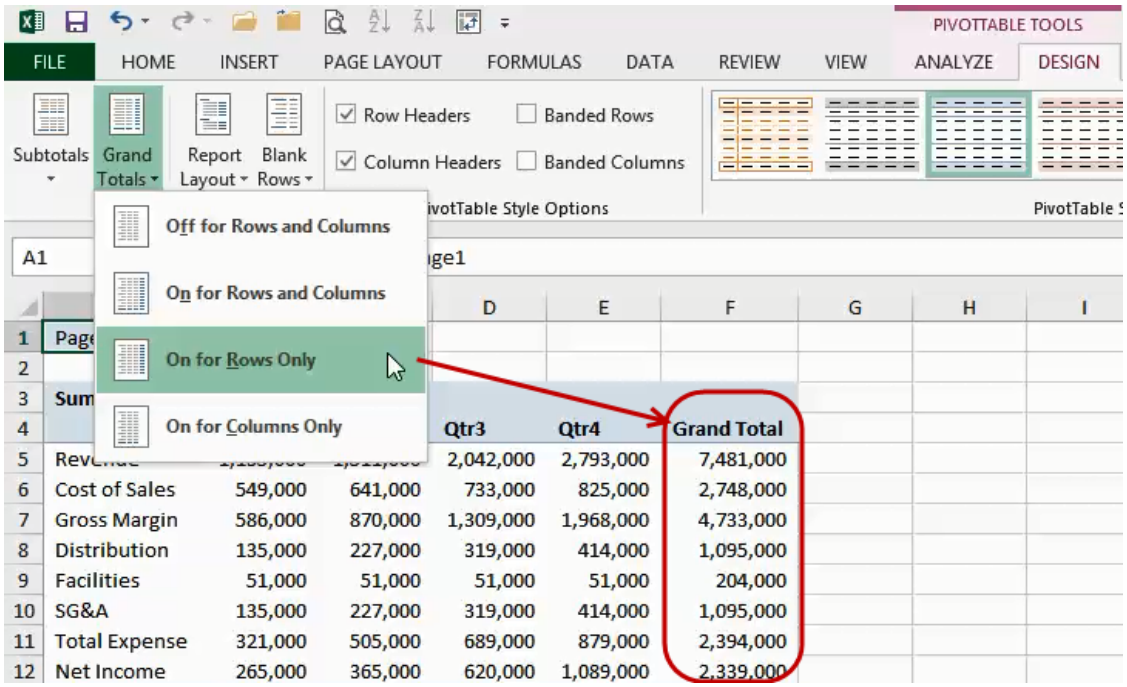

Figure 45 - Removing Grand Totals from PivotTable

Alternatively, to remove the grand totals, right-click on the face of the PivotTable and select **PivotTable Options** from the context-sensitive menu. On the **Totals & Filters** tab, uncheck **Show grand totals for columns**.

The only task remaining is to complete the PivotTable for presentation. Hide the field headings, center the column headings, rename the Filter to **Product Line**, and give the values field a descriptive name, such as **Budgeted Income Statements**.

The completed PivotTable should resemble the one shown in **Figure 46**. Keep in mind that all of the drag-and-drop PivotTable functionality is available in the consolidated report.

	A	B	C	D	E	F
1	Product Line	(All)				
2						
3	**Budgeted Income Statements**					
4		**Qtr1**	**Qtr2**	**Qtr3**	**Qtr4**	**Grand Total**
5	Revenue	1,135,000	1,511,000	2,042,000	2,793,000	7,481,000
6	Cost of Sales	549,000	641,000	733,000	825,000	2,748,000
7	Gross Margin	586,000	870,000	1,309,000	1,968,000	4,733,000
8	Distribution	135,000	227,000	319,000	414,000	1,095,000
9	Facilities	51,000	51,000	51,000	51,000	204,000
10	SG&A	135,000	227,000	319,000	414,000	1,095,000
11	Total Expense	321,000	505,000	689,000	879,000	2,394,000
12	Net Income	265,000	365,000	620,000	1,089,000	2,339,000

Figure 46 - Completed PivotTable

Pivoting Non-Identical Data Ranges

The tabulated data ranges that are to be combined using a multiple consolidated ranges PivotTable need not be identical. As a practical matter, they should be similar, but, again, there is no requirement that they have the same layout or content. In this example, we will combine several budget worksheets with different accounts and layouts. Combining data during the budget process consumes a significant portion of the total time spent by accounting staff in the budget process. Using PivotTables to make the combination can help reduce the time spent in the process and improve data accuracy while providing additional analytical capabilities.

Here is an overview of the characteristics of our sample data.

1. We have budget worksheets from three departments.

2. Two of the departments have identical accounts, but the third has one additional account. This makes the combination process using sum-through formulas cumbersome and error prone because the amounts on each worksheet do not line up properly. We would experience the same problem in situations where departmental managers altered the worksheet layouts or account structure in the budget process.

3. One of the departmental managers inexplicably changed the name of an account.

The departmental budgets are displayed in **Figure 47**. The manager in Product Design has changed the name of one account from Allocated Central IT to Central IT. The budget for Field Testing has an additional account, Outsourced Services, which is not found in the accounts of the other departments. Note that the amounts for each account on each budget are the same within quarters, so that we will be able to see from our example that the formulas are calculating correctly. Further, the differences in the accounts are highlighted with shading.

By combining these budgets in a PivotTable, the cumbersome task of summing through sheets that are not identical will be avoided while insuring computational accuracy and providing greater analytical capability. The process of creating the PivotTable is exactly the same as illustrated in the previous example. The initial PivotTable is displayed in **Figure 48**.

	A	B	C	D	E	F
1	**Product Design**					
2	**Expense Budget**					
3						
4		Q1	Q2	Q3	Q4	Total
5	Central IT	1,000.00	2,000.00	3,000.00	4,000.00	10,000.00
6	Allocated Facilities	100.00	200.00	300.00	400.00	1,000.00
7	Central Photocopying	100.00	200.00	300.00	400.00	1,000.00
8	Employee Benefits	100.00	200.00	300.00	400.00	1,000.00
9	Employee Wages	100.00	200.00	300.00	400.00	1,000.00
10	Payroll Taxes	100.00	200.00	300.00	400.00	1,000.00
11	Shipping	100.00	200.00	300.00	400.00	1,000.00
12	Supplies	100.00	200.00	300.00	400.00	1,000.00
13	Telecommunications	100.00	200.00	300.00	400.00	1,000.00
14	Travel	100.00	200.00	300.00	400.00	1,000.00
15	Utilities	100.00	200.00	300.00	400.00	1,000.00

	A	B	C	D	E	F
1	**Prototyping & Modeling**					
2	**Expense Budget**					
3						
4		Q1	Q2	Q3	Q4	Total
5	Allocated Central IT	100.00	200.00	300.00	400.00	1,000.00
6	Allocated Facilities	100.00	200.00	300.00	400.00	1,000.00
7	Central Photocopying	100.00	200.00	300.00	400.00	1,000.00
8	Employee Benefits	100.00	200.00	300.00	400.00	1,000.00
9	Employee Wages	100.00	200.00	300.00	400.00	1,000.00
10	Payroll Taxes	100.00	200.00	300.00	400.00	1,000.00
11	Shipping	100.00	200.00	300.00	400.00	1,000.00
12	Supplies	100.00	200.00	300.00	400.00	1,000.00
13	Telecommunications	100.00	200.00	300.00	400.00	1,000.00
14	Travel	100.00	200.00	300.00	400.00	1,000.00
15	Utilities	100.00	200.00	300.00	400.00	1,000.00

	A	B	C	D	E	F
1	**Field Testing**					
2	**Expense Budget**					
3						
4		Q1	Q2	Q3	Q4	Total
5	Allocated Central IT	100.00	200.00	300.00	400.00	1,000.00
6	Allocated Facilities	100.00	200.00	300.00	400.00	1,000.00
7	Central Photocopying	100.00	200.00	300.00	400.00	1,000.00
8	Employee Benefits	100.00	200.00	300.00	400.00	1,000.00
9	Employee Wages	100.00	200.00	300.00	400.00	1,000.00
10	Outsourced Services	5,000.00	5,000.00	5,000.00	5,000.00	20,000.00
11	Payroll Taxes	100.00	200.00	300.00	400.00	1,000.00
12	Shipping	100.00	200.00	300.00	400.00	1,000.00
13	Supplies	100.00	200.00	300.00	400.00	1,000.00
14	Telecommunications	100.00	200.00	300.00	400.00	1,000.00
15	Travel	100.00	200.00	300.00	400.00	1,000.00
16	Utilities	100.00	200.00	300.00	400.00	1,000.00

Figure 47 **- Non-Identical Departmental Budgets**

	A	B	C	D	E	F
1	Page1	(All)				
2						
3	**Sum of Value**					
4		**Q1**	**Q2**	**Q3**	**Q4**	**Grand Total**
5	Allocated Central IT	200.00	400.00	600.00	800.00	2,000.00
6	Allocated Facilities	300.00	600.00	900.00	1,200.00	3,000.00
7	Central IT	1,000.00	2,000.00	3,000.00	4,000.00	10,000.00
8	Central Photocopying	300.00	600.00	900.00	1,200.00	3,000.00
9	Employee Benefits	300.00	600.00	900.00	1,200.00	3,000.00
10	Employee Wages	300.00	600.00	900.00	1,200.00	3,000.00
11	Outsourced Services	5,000.00	5,000.00	5,000.00	5,000.00	20,000.00
12	Payroll Taxes	300.00	600.00	900.00	1,200.00	3,000.00
13	Shipping	300.00	600.00	900.00	1,200.00	3,000.00
14	Supplies	300.00	600.00	900.00	1,200.00	3,000.00
15	Telecommunications	300.00	600.00	900.00	1,200.00	3,000.00
16	Travel	300.00	600.00	900.00	1,200.00	3,000.00
17	Utilities	300.00	600.00	900.00	1,200.00	3,000.00
18	**Grand Total**	**9,200.00**	**13,400.00**	**17,600.00**	**21,800.00**	**62,000.00**

Figure 48 - Initial PivotTable Showing All Department Accounts Combined

Note that all accounts, including the Outsourced Services account in Field Testing, were combined properly. The account name changed by the manager in Product Design, Central IT, was combined on a separate line. To force the account to combine properly, change the *source data* for Product Design, so that the account name reads **Allocated Central IT** and then **Refresh** the PivotTable. After performing these modifications, the PivotTable should resemble the one displayed in **Figure 49**.

	A	B	C	D	E	F
1	Page1	(All)				
2						
3	**Sum of Value**					
4		**Q1**	**Q2**	**Q3**	**Q4**	**Grand Total**
5	Allocated Central IT	1,200.00	2,400.00	3,600.00	4,800.00	12,000.00
6	Allocated Facilities	300.00	600.00	900.00	1,200.00	3,000.00
7	Central Photocopying	300.00	600.00	900.00	1,200.00	3,000.00
8	Employee Benefits	300.00	600.00	900.00	1,200.00	3,000.00
9	Employee Wages	300.00	600.00	900.00	1,200.00	3,000.00
10	Outsourced Services	5,000.00	5,000.00	5,000.00	5,000.00	20,000.00
11	Payroll Taxes	300.00	600.00	900.00	1,200.00	3,000.00
12	Shipping	300.00	600.00	900.00	1,200.00	3,000.00
13	Supplies	300.00	600.00	900.00	1,200.00	3,000.00
14	Telecommunications	300.00	600.00	900.00	1,200.00	3,000.00
15	Travel	300.00	600.00	900.00	1,200.00	3,000.00
16	Utilities	300.00	600.00	900.00	1,200.00	3,000.00
17	**Grand Total**	**9,200.00**	**13,400.00**	**17,600.00**	**21,800.00**	**62,000.00**

Figure 49 - Modified PivotTable with Allocated Central IT Account Correctly Combined

Of course, since we used a PivotTable to make the combination, we have additional analytical capabilities that we would not have had if we had combined the budget data using some other method.

Letting Excel Create a Single Page Field

In our first example of a PivotTable based on multiple consolidation ranges, we chose to create the page fields in order to gain maximum flexibility in the process. Alternatively, we could have allowed Excel to create a single page field for us, thereby allowing Excel to do some of this tedious work automatically. Since most PivotTables based on multiple consolidation ranges are likely to have only one page field, allowing Excel to create the page field is a better alternative.

Let's explore the effects of allowing Excel to create the page field. We will use the departmental budget data in this example. Begin the process of creating a PivotTable based on multiple consolidation ranges. In Step 2a of the wizard, select **Create a single page field for me** as shown in **Figure 50**.

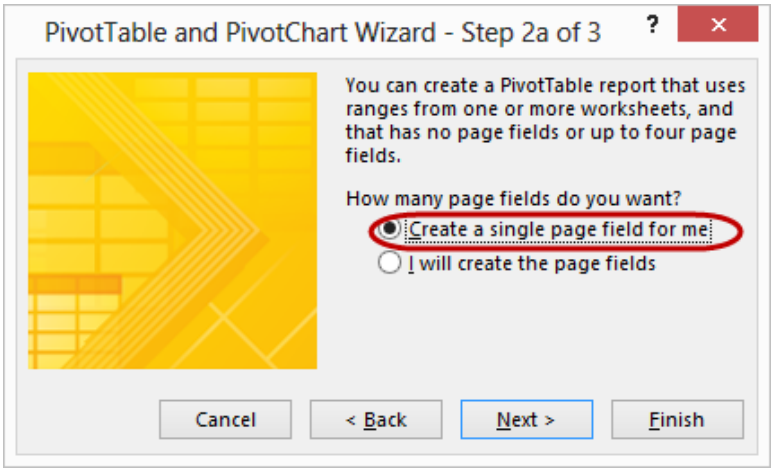

Figure 50 - Allow Excel to Create the Page Field

In the next step, select the ranges to be consolidated and then complete the PivotTable. Now, examine the drop-down list of available filters in the Page Field. Notice that the filters are not named Product Design, Prototyping & Modeling, and Field Testing but are named Item 1, Item 2, and Item 3. Whenever Excel creates the Page Field, it names the item filters *Item x*, beginning with $x = 1$ through the number of worksheets consolidated. Also, note that the items cannot be renamed *in the Page Field*. However, the Page Field can be dragged into the table, where the items can be renamed, and then can be dragged back to the Page Field area.

More importantly, the order of the items created by Excel is the same as the order in which the data ranges are arranged in the wizard range box. The data ranges are always arranged in alphabetical order, regardless of the order in which the ranges were added to the range box. In other words, if the data range for Field Testing is the first range in the wizard, as it is in this case, then Item 1 represents Field Testing. If Excel creates the Page Field, then users must pay close attention to the order in which the data ranges are arranged in the wizard range box in order to avoid errors in renaming the filter items. The described process is illustrated in **Figure 51**.

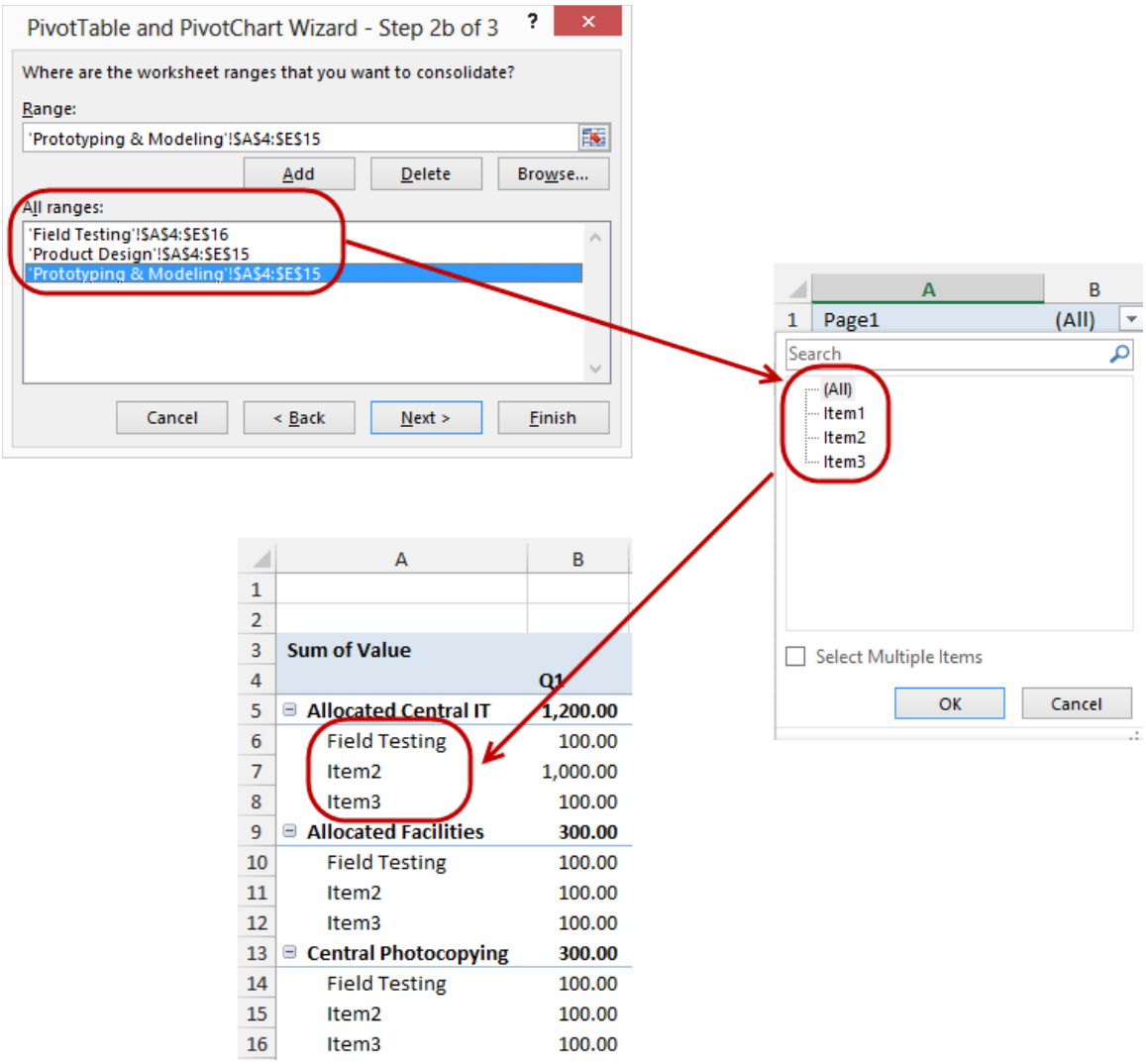

Figure 51 - Identifying and Renaming Page Field Items