

# DATA ANALYTICS

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# PIVOT TABLES

- The **pivot table** is an Excel tool that allows you to break data down by categories.
- Sometimes pivot tables are used to display tables of counts, often called crosstabs or contingency tables.
- However, crosstabs typically list only counts, whereas pivot tables can list counts, sums, averages, and other summary measures.



# ELECMART SALES.XLSX

- **Objective:** To use pivot tables to break down the customer order data by a number of categorical variables.
- **Solution:** Data set contains data on 400 customer orders during several months for ElecMart company.
- Create a pivot table by clicking the PivotTable button on the Insert ribbon.


	A	B	C	D	E	F	G	H	I	J
1	Date	Day	Time	Region	Card Type	Gender	Buy Category	Items Ordered	Total Cost	High Item
2	6-Mar	Tue	Morning	West	ElecMart	Female	High	4	\$136.97	\$79.97
3	6-Mar	Tue	Morning	West	Other	Female	Medium	1	\$25.55	\$25.55
4	6-Mar	Tue	Afternoon	West	ElecMart	Female	Medium	5	\$113.95	\$90.47
5	6-Mar	Tue	Afternoon	NorthEast	Other	Female	Low	1	\$6.82	\$6.82
6	6-Mar	Tue	Afternoon	West	ElecMart	Male	Medium	4	\$147.32	\$83.21
7	6-Mar	Tue	Afternoon	NorthEast	Other	Female	Medium	5	\$142.15	\$50.90
8	7-Mar	Wed	Evening	West	Other	Male	Low	1	\$18.65	\$18.65
9	7-Mar	Wed	Evening	South	Other	Male	High	4	\$178.34	\$161.93
10	7-Mar	Wed	Evening	West	Other	Male	Low	2	\$25.83	\$15.91
11	8-Mar	Thu	Morning	MidWest	Other	Female	Low	1	\$18.13	\$18.13
12	8-Mar	Thu	Morning	NorthEast	ElecMart	Female	Medium	2	\$54.52	\$54.38
13	8-Mar	Thu	Afternoon	South	Other	Male	Medium	2	\$61.93	\$56.32
14	9-Mar	Fri	Morning	NorthEast	ElecMart	Male	High	3	\$147.68	\$96.64
15	9-Mar	Fri	Afternoon	NorthEast	Other	Male	Low	1	\$27.24	\$27.24





# PIVOT TABLES


PivotTable1

To build a report, choose fields from the PivotTable Field List



Drag fields between areas below:

 Report Filter  Column Lab...

 Row Labels  $\Sigma$  Values

☐ Defer Layout Upd...

PivotTable Field List

Choose fields to add to report:

- ☐ Date
- ☐ Day
- ☐ Time
- ☐ Region
- ☐ Card Type
- ☐ Gender
- ☐ Buy Category
- ☐ Items Ordered
- ☐ Total Cost
- ☐ High Item



# ELECMART SALES.XLSX

	A	B	C
1			
2			
3	<b>Time</b> ▼	<b>Region</b> ▼	<b>Sum of Total Cost</b>
4	☐ <b>Afternoon</b>	MidWest	3187.16
5		NorthEast	8159.78
6		South	5729.72
7		West	7188.94
8	<b>Afternoon Total</b>		<b>24265.6</b>
9	☐ <b>Evening</b>	MidWest	2552.89
10		NorthEast	5941.49
11		South	3864.12
12		West	6475.8
13	<b>Evening Total</b>		<b>18834.3</b>
14	☐ <b>Morning</b>	MidWest	3878.22
15		NorthEast	5084.57
16		South	3835.86
17		West	5628.66
18	<b>Morning Total</b>		<b>18427.31</b>
19	<b>Grand Total</b>		<b>61527.21</b>

# HIDING CATEGORIES (FILTERING)

- You can filter out any items in a pivot table that you don't want to see.
  - Click the Row Labels dropdown arrow of the active field and check the items you want to filter on.
  - A pivot table with hidden categories is shown below.

	A	B	C
1			
2			
3	<b>Time</b> ▼	<b>Region</b> ▼	<b>Sum of Total Cost</b>
4	☒ <b>Afternoon</b>	MidWest	3187.16
5		South	5729.72
6		West	7188.94
7	<b>Afternoon Total</b>		<b>16105.82</b>
8	☒ <b>Morning</b>	MidWest	3878.22
9		South	3835.86
10		West	5628.66
11	<b>Morning Total</b>		<b>13342.74</b>
12	<b>Grand Total</b>		<b>29448.56</b>

# SORTING ON VALUES OR CATEGORIES

- It is easy to sort in a pivot table, either by the numbers in the Values area or by the labels in a Rows or Columns field.
  - To sort by the numbers in the Values area, right-click any number and select Sort.
  - To sort on the labels of a Rows or Columns field, right-click any of the categories and select Sort.
    - You can also click the dropdown arrow for the field and get the dialog box that allows both sorting and filtering.



# CHANGING LOCATIONS OF FIELDS (PIVOTING)

- You can choose where to place variables in a pivot table.
  - For example, to place the Region variable in the Columns area, drag the Region button from the Rows area of the PivotTable Fields pane to the Columns area.

	A	B	C	D	E	F
1						
2						
3	<b>Sum of Total Cost</b>	<b>Column Labels</b> ▼				
4	<b>Row Labels</b> ▼	<b>MidWest</b>	<b>NorthEast</b>	<b>South</b>	<b>West</b>	<b>Grand Total</b>
5	Morning	3878.22	5084.57	3835.86	5628.66	18427.31
6	Afternoon	3187.16	8159.78	5729.72	7188.94	24265.6
7	Evening	2552.89	5941.49	3864.12	6475.8	18834.3
8	<b>Grand Total</b>	<b>9618.27</b>	<b>19185.84</b>	<b>13429.7</b>	<b>19293.4</b>	<b>61527.21</b>



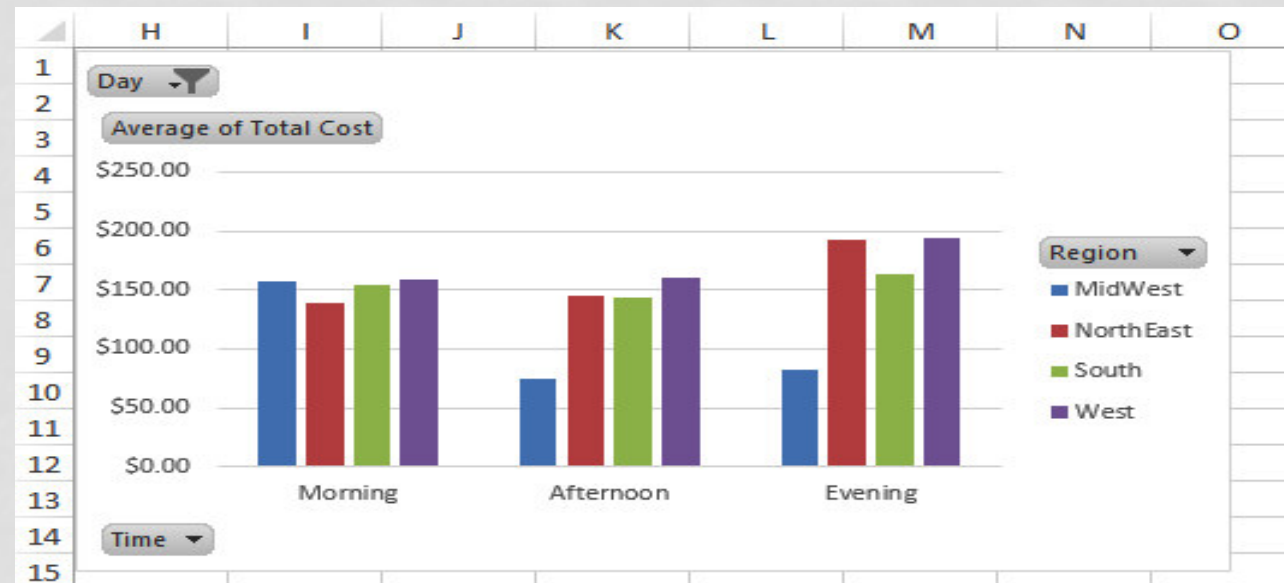
# CHANGING FIELD SETTINGS

- You can change various settings in the Field Settings dialog box.
  - To get to this dialog box:
    - Click the Field Setting button on the Analyze/Options ribbon.
    - OR right-click any of the pivot table cells and select the Field Settings item.
  - The pivot table with Value Field Settings changed to Average is shown below.

	A	B	C	D	E	F
1	Day	(Multiple Items) ▼				
2						
3	Average of Total Cost	Column Labels ▼				
4	Row Labels ▼	MidWest	NorthEast	South	West	Grand Total
5	Morning	\$157.11	\$139.05	\$153.59	\$158.51	\$154.01
6	Afternoon	\$73.97	\$145.48	\$143.51	\$159.97	\$144.79
7	Evening	\$82.45	\$192.46	\$163.23	\$193.91	\$175.66
8	Grand Total	\$118.08	\$163.43	\$152.24	\$170.72	\$158.14

# PIVOT CHARTS

- It is easy to accompany pivot tables with **pivot charts**.
  - These charts adapt automatically to the underlying pivot table.
  - To create a pivot chart, click anywhere inside the pivot table, select the PivotChart button on the Analyze/Options ribbon, and select a chart type.



# MULTIPLE VARIABLES IN THE VALUES AREA

- More than a single variable can be placed in the Values area.
- Also, a given variable in the Values area can be summarized by more than one summarizing function.

	A	B	C	D	E	F	G
1	Day	(Multiple Items)					
2							
3		Column Labels					
4		MidWest	NorthEast				
5	Row Labels	Average of Total Cost	Sum of Total Cost	Average of Total Cost	Sum of Total Cost	Total Average of Total Cost	Total Sum of Total Cost
6	Morning	\$157.11	785.53	\$139.05	695.26	\$148.08	1480.79
7	Afternoon	\$73.97	147.93	\$145.48	1600.23	\$134.47	1748.16
8	Evening	\$82.45	247.35	\$192.46	2117.08	\$168.89	2364.43
9	Grand Total	\$118.08	1180.81	\$163.43	4412.57	\$151.17	5593.38

# SUMMARIZING BY COUNT

- The variable in the Values area can be summarized by the Count function.
  - This is useful when you want to know, for example, how *many* of the orders were placed by females in the South.
  - Right-click any number in the pivot table, select Value Field Settings, and select the Count function.

	A	B	C	D	E	F
1						
2						
3	Count	Column Labels ▼				
4	Row Labels ▼	MidWest	NorthEast	South	West	Grand Total
5	Morning	26	33	27	38	124
6	Afternoon	26	48	39	41	154
7	Evening	19	34	27	42	122
8	Grand Total	71	115	93	121	400

# GROUPING

- Categories in a Rows or Columns variable can be grouped.
- Suppose you want to summarize Sum of Total Cost by Date.
  - Starting with a blank pivot table, check both Date and Total Cost in the PivotTable Fields pane.
  - Then right-click any date and select Group.

	A	B
1		
2		
3	<b>Row Labels</b> ▼	<b>Sum of Total Cost</b>
4	Mar	\$9,383.26
5	Apr	\$14,589.91
6	May	\$19,468.11
7	Jun	\$18,085.93
8	<b>Grand Total</b>	<b>\$61,527.21</b>



# OTHER PIVOT TABLE FEATURES

- Showing/hiding subtotals and grand totals (check the Layout options on the Design ribbon)
- Dealing with blank rows, that is, categories with no data (right-click any number, choose PivotTable Options, and check the options on the Layout & Format tab)
- Displaying the data behind a given number in a pivot table (double-click any number in the Values area to get a new worksheet)
- Formatting a pivot table with various styles (check the style options on the Design ribbon)
- Moving or renaming pivot tables (check the PivotTable and Action groups on the Analyze/Options ribbon)
- Refreshing pivot tables as the underlying data changes (check the Refresh dropdown list on the Analyze/Options ribbon)
- Creating pivot table formulas for calculated fields or calculated items (check the Formulas dropdown list on the Analyze/Options ribbon)



# LASAGNA TRIERS.XLSX

- **Objective:** To use pivot tables to explore which demographic variables help to distinguish lasagna triers from nontriers.
- **Solution:** Data set contains data on over 800 potential customers being tracked by a frozen lasagna company.
- Set up a pivot table that shows counts of triers and nontriers for different categories of the variables.

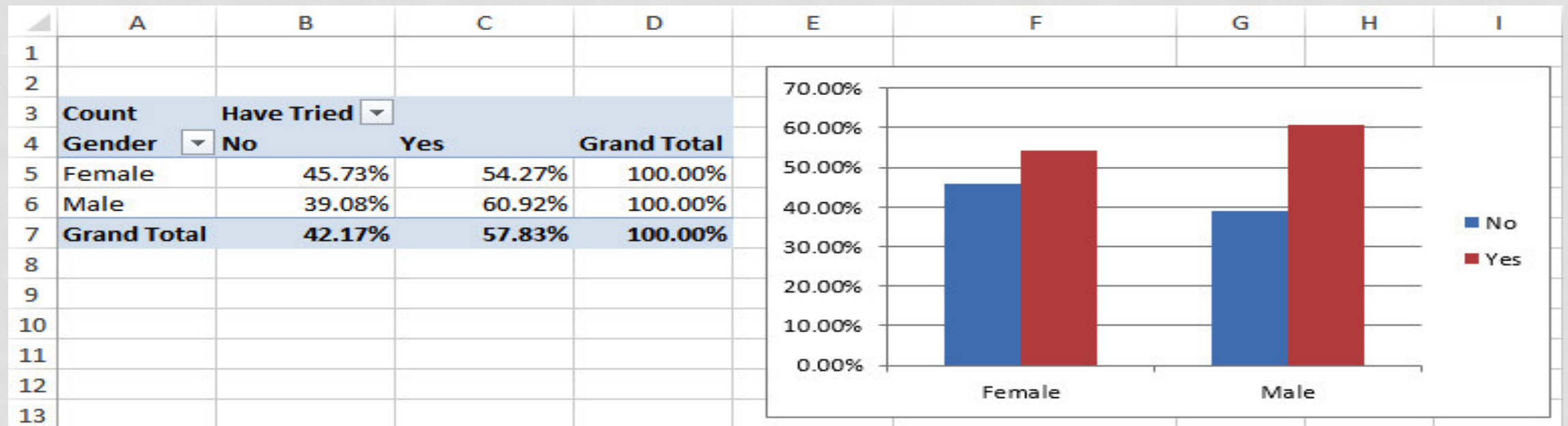
	A	B	C	D	E	F	G	H	I	J	K	L	M
1	Person	Age	Weight	Income	Pay Type	Car Value	CC Debt	Gender	Live Alone	Dwell Type	Mall Trips	Nbhd	Have Tried
2	1	48	175	65500	Hourly	2190	3510	Male	No	Home	7	East	No
3	2	33	202	29100	Hourly	2110	740	Female	No	Condo	4	East	Yes
4	3	51	188	32200	Salaried	5140	910	Male	No	Condo	1	East	No
5	4	56	244	19000	Hourly	700	1620	Female	No	Home	3	West	No
6	5	28	218	81400	Salaried	26620	600	Male	No	Apt	3	West	Yes
7	6	51	173	73000	Salaried	24520	950	Female	No	Condo	2	East	No
8	7	44	182	66400	Salaried	10130	3500	Female	Yes	Condo	6	West	Yes
9	8	29	189	46200	Salaried	10250	2860	Male	No	Condo	5	West	Yes
10	9	28	200	61100	Salaried	17210	3180	Male	No	Condo	10	West	Yes
11	10	29	209	9800	Salaried	2090	1270	Female	Yes	Apt	7	East	Yes





# LASAGNA TRIERS.XLSX

## Pivot Table and Pivot Chart for Examining the Effect of Gender



# SLICERS AND TIMELINES

- In Excel 2010, Microsoft added **slicers**—lists of the distinct values of any variable, which you can then filter on.
  - You add a slicer from the Analyze/Options ribbon under PivotTable Tools.
- In Excel 2013, a Timeline feature was added. A Timeline is like a slicer, but it is specifically for filtering on a date variable.

# PIVOT TABLE WITH SLICERS AND A TIMELINE

	A	B	C	D	E	F	G	H	I
1									
2									
3	Row Labels	Sum of Total Cost							
4	Afternoon	\$650.80							
5	Evening	\$2,442.05							
6	Grand Total	\$3,092.85							
7									
8									
9									
10									
11									
12									
13									
14									
15									
16									
17									

**Region**

MidWest

NorthEast

South

West

**Gender**

Female

Male

**Purchase Date**

Apr - May 2012 MONTHS

2012

EB MAR APR MAY JUN JUL AUG

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