

Financial Statement Analysis

In this chapter you will learn:

- How to perform a vertical financial analysis
- How to create a pie chart of expenses
- How to perform a horizontal financial analysis
- How to create a column chart of expenses
- How to calculate financial ratios

Case: What SUP, Inc.

Nathan and Meagan are ready to evaluate the company's performance, examine trends and relationships, and assess liquidity and solvency. Kyle suggests three forms of analysis that can provide information to Nathan and Meagan for business decision making: vertical, horizontal, and ratio analysis.

You recall learning about these three methods of analysis while studying financial accounting. Kyle reminds you that Excel is a great tool for preparing these analyses and suggests that you take the lead in explaining the formulas used in creating these types of worksheets.

“Can Excel also help us prepare charts? We have to prepare some information for our bankers, and they seem to prefer both numbers and charts,” Nathan asks. “Most definitely!” Kyle answers. “We’ll use Excel to look at the financial information we recently created, and then we’ll compute vertical, horizontal, and ratio analyses as well as prepare charts to describe important relationships and trends.”

Vertical Analysis

Vertical analysis, often referred to as *component* analysis, is used to express each item on a particular financial statement as a percentage of a single base amount. In an income statement, the base is sales revenue. Each expense is expressed as a percentage of sales revenue. Meagan seems very interested in comparing what percentages of revenues are spent on various expenses and how that compares from one period to the next.

Video Demonstration



DEMO 3A Vertical analysis with a pie chart

To create a vertical analysis on an income statement:

- 1** Click **File** and then click **Open**.

- 2 Navigate the Open window to the location of this text's student files. (The location would be the CD provided with the text or from your computer lab's server.)
- 3 Double-click the file **ch3-01**, which should be located in a Ch 03 folder.
- 4 Click the **Income Statement** tab.
- 5 Right-click column **C** and click **Insert** to insert a new column.
- 6 Click cell **C4** and type **%** as a label to the new column.
- 7 Click cell **C5** and type the formula **=B5/\$B\$5**; then press **[Enter]**. (Note: use an absolute reference in the denominator so you can fill down the formula later.)
- 8 Click cell **C5** again and reformat the cell by clicking the **%** tool in the Number group of the Home tab.
- 9 Resize column C to reveal all values.
- 10 Fill down the formula in C5 to C16 by dragging the handle in the lower right corner of cell C5 to C16. (Note: this will also copy down the formatting from cell C5, removing border formats that you can fix later.)
- 11 Eliminate the formula from cell C8 by clicking the cell and pressing **[Delete]**, then **[Enter]**.
- 12 Add appropriate border formats to cells C6, C13, and C16.
- 13 Repeat Steps 6 to 11 in column E, substituting E for C in all column references. Substitute D for B in the formulas. Your worksheet should look like Figure 3.1.

	A	B	C	D	E
1	<i>What SUP, Inc.</i>				
2	<i>Income Statement</i>				
3	<i>For the Year Ended</i>				
4		12/31/15	%	12/31/16	%
5	Sales Revenue	\$ 850,511.65	100%	\$ 975,814.10	100%
6	Less: Cost of Goods Sold	442,619.87	52%	595,413.84	61%
7	Gross Margin	407,891.78	48%	380,400.26	39%
8	Expenses:				
9	Advertising	20,654.21	2%	36,148.41	4%
10	Depreciation	22,000.00	3%	22,000.00	2%
11	Interest	30,846.24	4%	32,338.94	3%
12	Other	10,000.00	1%	18,000.00	2%
13	Payroll	115,365.11	14%	129,547.97	13%
14	Utilities	23,541.25	3%	27,546.16	3%
15	Net income before taxes	185,484.97	22%	114,818.78	12%
16	Income taxes	65,218.98	8%	67,000.00	7%
17	Net income	\$ 120,265.99	14%	\$ 47,818.78	5%

Figure 3.1Income Statement
Vertical Analysis

- 14 Click **File** again and then click **Save As**. (This preserves your original student and provides a unique name for your file.)

- 15** Change the file name to reflect the vertical analysis just performed and your name by using the underscore key as before. In this example, the file will be saved as ch3-01_Vertical_Analysis_student_name (replace student_name with your name). Save your file to a location (e.g., a USB drive) from which you can retrieve it later.
- 16** Switch to a Page Layout view. Place your name in the left section of the footer. Note that the file name is already in the right section of the footer.
- 17** Switch back to a Normal view.
- 18** Click **File** and then click **Print** to make sure the worksheet will print the way you want.
- 19** Click **Print** to print your analysis.
- 20** Save your file once again but do not close it.

Meagan is pleased that Excel can produce these amounts so quickly. She notes that the firm's gross profit percentage is down from the previous year and that the cost of goods sold as a percentage of sales is higher. This helps explain the reduction in net income as a percentage of sales.

"Is the balance sheet used for vertical analysis as well?" Nathan asks. "Yes," you respond.

In a balance sheet the base is total assets. Each asset, liability, and equity component is expressed as a percentage of total assets.

To create a vertical analysis on a balance sheet:

- 1** Click the **Home** tab and then click the **Balance Sheet** worksheet tab.
- 2** Right-click column **C** and click **Insert** to insert a new column.
- 3** Click cell **C5** and type **%** as a label to the new column.
- 4** Click cell **C7** and type the formula **=B7/\$B\$17**, then press [**Enter**]. (Note: Once again, use an absolute reference in the denominator so you can fill down the formula later.)
- 5** Click cell **C7** again and reformat the cell by clicking the **%** tool in the Number group of the Home tab.
- 6** Resize column **C** to 61 pixels.
- 7** Fill down the formula in **C7** to **C17** by dragging the handle in the lower right corner of cell **C7** to **C17**. (Note: This will also copy down the formatting from cell **C7**, removing border formats that you can fix later.)

- 8 Eliminate the formula from cell C12 by clicking the cell and pressing [Delete], then [Enter].
- 9 Add appropriate border formats to cell C17.
- 10 Repeat Steps 3 to 9 in column E, substituting E for C in all column references. The asset part of your worksheet should look like Figure 3.2.

	A	B	C	D	E
1	<i>What SUP, Inc.</i>				
2	<i>Balance Sheet</i>				
3	<i>as of</i>				
4					
5	Assets	12/31/15	%	12/31/16	%
6	Current Assets:				
7	Cash	\$ 27,532.89	4%	\$ 18,481.56	3%
8	Accounts Receivable	84,245.25	12%	102,544.24	14%
9	Inventory	125,351.45	18%	152,154.21	21%
10	Prepaid Expenses	15,625.26	2%	15,241.75	2%
11	Supplies	10,245.15	2%	6,578.24	1%
12	Property, Plant, and Equipment:				
13	Land	120,000.00	18%	120,000.00	17%
14	Building	300,000.00	44%	315,000.00	44%
15	Equipment	65,000.00	10%	70,000.00	10%
16	Less: Accumulated Depreciation	(68,000.00)	-10%	(90,000.00)	-13%
17	Total	\$ 680,000.00	100%	\$ 710,000.00	100%

Figure 3.2

Balance Sheet Assets
Vertical Analysis

- 11 Save your work.
- 12 Click cell C22 and type the formula `=B22/B29`; then press [Enter]. (Note: Again, use an absolute reference in the denominator.)
- 13 Click cell C22 again and reformat the cell by clicking the % tool in the Number group of the Home tab.
- 14 Fill down the formula in C22 to C29 by dragging the handle in the lower right corner of cell C22 to C29. (Note: This will also copy down the formatting from cell C7, removing border formats that you can fix later.)
- 15 Eliminate the formula from cell C26 by clicking the cell and pressing [Delete], then [Enter].
- 16 Add appropriate border formats to cell C29.
- 17 Repeat Steps 12 to 16 in column E, substituting E for C in all column references. The liability and equity part of your worksheet should look like Figure 3.3.
- 18 Switch to a Page Layout view. Place your name in the left section of the footer. Note that the file name is already in the right section of the footer.
- 19 Switch back to a Normal view.
- 20 Click **File** and then click **Print** to make sure the worksheet will print the way you want.

Figure 3.3
Balance Sheet Liabilities
and Equities Vertical
Analysis

	A	B	C	D	E
19	Liabilities and Stockholders' Equity				
20	Liabilities				
21	Current Liabilities:				
22	Accounts Payable	\$ 50,182.10	7%	\$ 82,305.11	12%
23	Notes Payable	\$ 25,000.00	4%	\$ 19,000.00	3%
24	Payroll Liabilities	2,120.54	0%	8,178.75	1%
25	Long-Term Debt	400,000.00	59%	350,000.00	49%
26	Stockholders' Equity				
27	Common Stock	10,000.00	1%	10,000.00	1%
28	Retained Earnings	192,697.36	28%	240,516.14	34%
29	Total	\$ 680,000.00	100%	\$ 710,000.00	100%
30					
31					
32					
33					
34					
35					

21 Click **Print** to print your analysis.

22 Save your file but do not close it.

Once again Meagan notes some interesting facts from the vertical analysis of the balance sheet. A larger percentage of total assets are invested in accounts receivable and inventory than in the prior year. Yet long-term debt is down, offset by an increase in retained earnings as a percentage of total assets.

To complete the vertical analysis, you offer to demonstrate Excel's charting capability by creating a pie chart of expenses for the year ended December 31, 2016.

Pie Charts

"Excel's chart wizard makes creating a chart from a worksheet a breeze," you remark. "This will give you a graphical picture of the firm's expenses as a percentage of revenues."

To create a pie chart of expenses:

- 1 Click on **Income Statement** worksheet tab and select cells **D9** through **D14**.
- 2 Click the **Insert** tab on the Ribbon and then click the **Pie Chart** tool on the Charts group.
- 3 Select **3-D Pie** as shown in Figure 3.4. **Trouble?** If your window is too small you may not see Pie as an option in the Charts group and instead will only see the text Charts. Widen the window to reveal the chart options available or click the Charts group and select Pie.

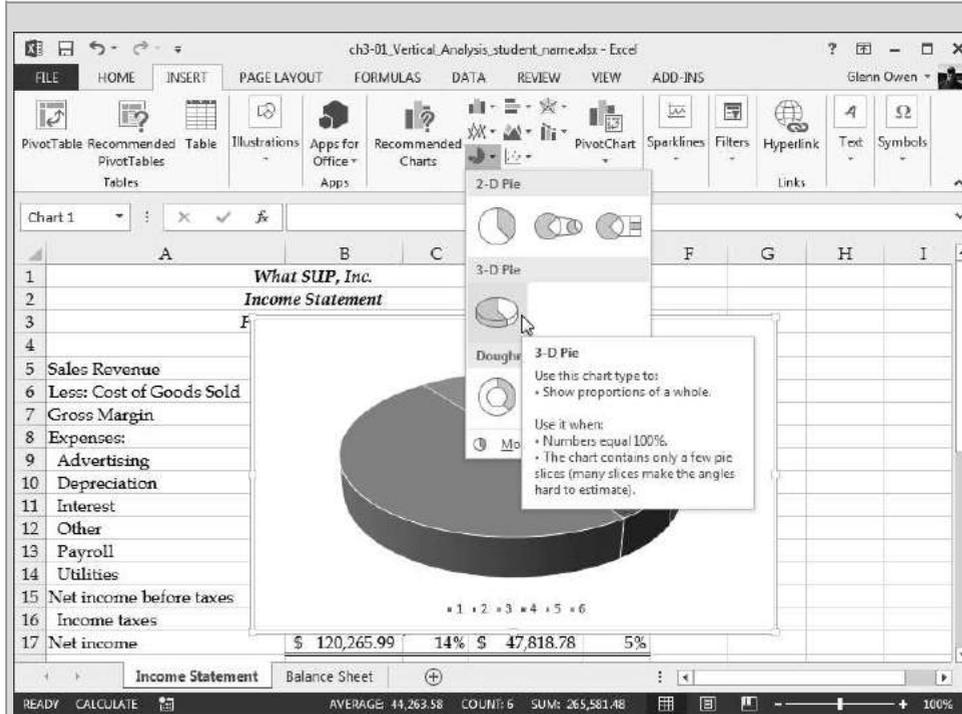


Figure 3.4
Creating a New Pie Chart

- 4 In the Chart Layouts group select **Style 6**. See Figure 3.5. Your window may look different if it is sized larger. If so just select Layout 6 from the Chart Layouts group.

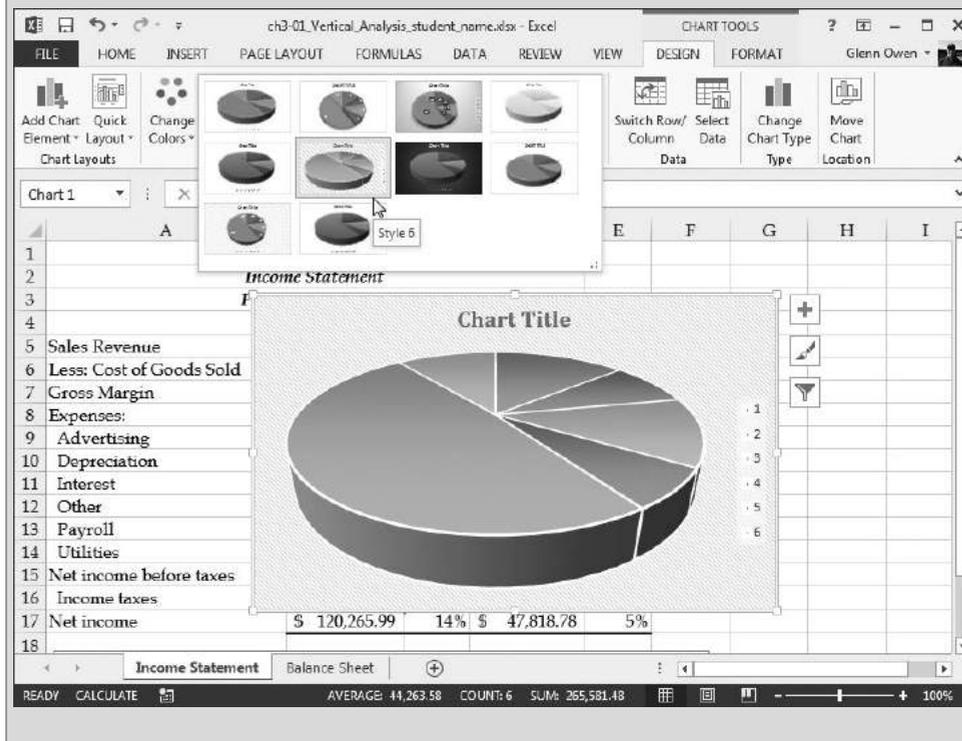
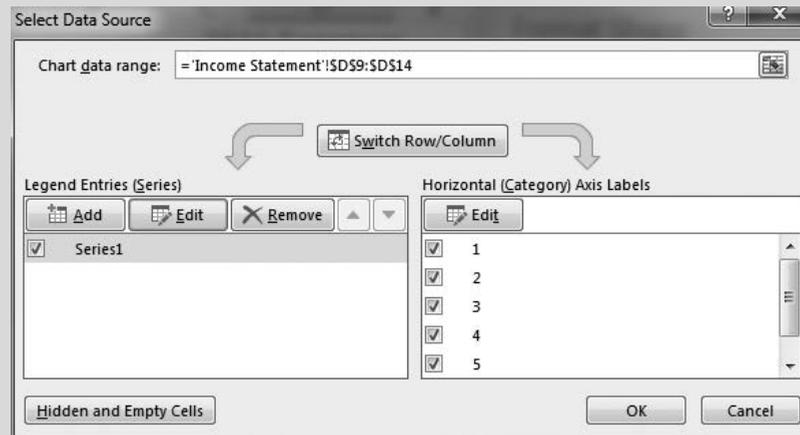


Figure 3.5
Modifying a Chart Layout

- 5 Double-click the text **Chart Title** and then type **2016 Expenses** as the new chart title.
- 6 Click the **Select Data** tool in the Data group.
- 7 Click **Edit** under the text Horizontal (Category) Axis Labels as shown in Figure 3.6.

Figure 3.6
Editing the Pie Chart
Axis Labels



- 8 Type **=‘Income Statement’!\$A\$9:\$A\$14** as the Axis label range and then click **OK**. (Alternatively, you could click the button on the right-hand side of the window and then select the range A9:A14 instead of typing the cell location.)
- 9 Click **OK** to close the Select Data Source window.
- 10 Click anywhere in the chart and, holding the mouse button down, drag the new chart so that it appears below the data.
- 11 Click in the lower right-hand corner of the chart and, holding the mouse button down, resize the chart so that it fits in the window; see Figure 3.7.
- 12 With the chart still selected, click **File** and then click **Print** to make sure the chart will print the way you want.
- 13 Click **Print** to then print the chart.
- 14 Save your work and then close the file.

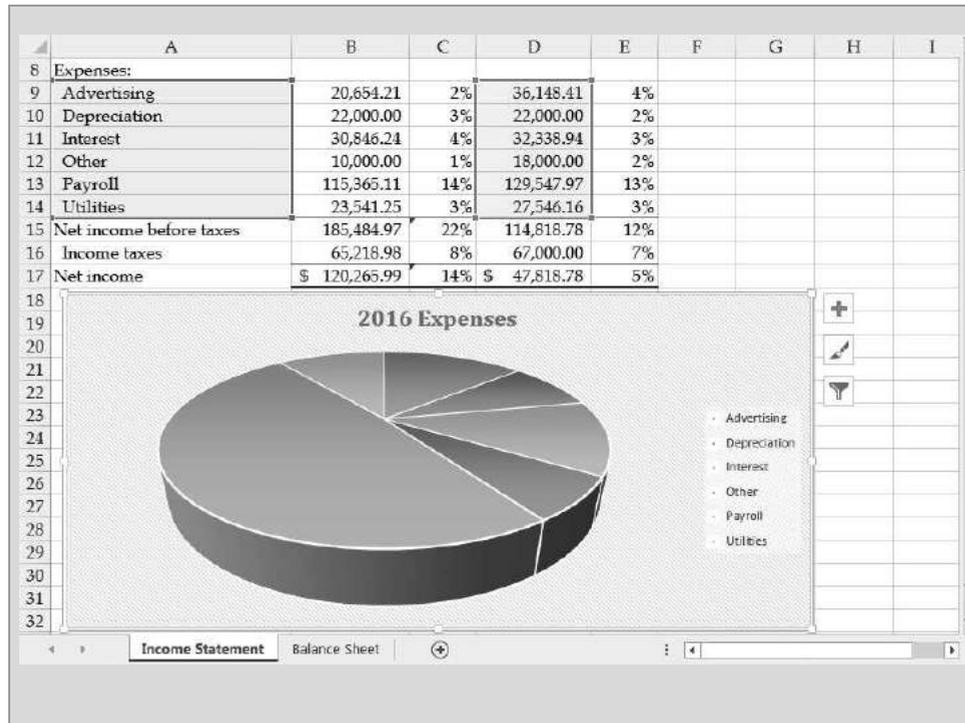


Figure 3.7

Pie Chart and Vertical Analysis Income Statement

You have now completed the vertical analysis. Nathan and Meagan are eager to examine the percentages and the chart more carefully, but not until they see how horizontal and ratio analyses can be created in Excel.

Horizontal Analysis

Horizontal analysis examines trends over time. This can include comparisons of months, quarters, or years for both the income statement and the balance sheet. Income statements and balance sheets for two or more periods are compared side by side, and a percentage increase or decrease is computed between periods.

“Isn’t that what we just did in vertical analysis?” Meagan asks. Kyle replies: “The percentages computed in vertical analysis are usually done for just one period, although they are often compared period to period. Remember, vertical analysis compares each statement element with a single base amount, such as sales or total assets, whereas horizontal analysis compares elements side by side with other periods.”

To create a horizontal analysis on an income statement:

- 1 Open ch3-01 (This is the same file you opened for vertical analysis. It should still look the same, because the changes you made were saved under another file name.)
- 2 Click the **Home** tab on the Ribbon and then click the **Income Statement** worksheet tab.

- 3 Click cell **D4** and type **% Change** as a label to the column.
- 4 Format cell D4 bold, center, bottom align, and with a bottom border.
- 5 Click cell **D5** and type the formula $=\text{(C5-B5)/B5}$; then press **[Enter]**.
- 6 Format cell D5 as Percent Style by clicking cell **D5** and selecting the **Percent Style** tool on the Number group on the Home tab.
- 7 Use the fill-down procedure to copy the formula from D5 to D17.
- 8 Delete the formula in cell D8.
- 9 Format cells D6 and D14 with a bottom border.
- 10 Format cell D17 with a top and double bottom border.
- 11 Resize column D to 96 pixels. Your completed income statement with horizontal analysis should look like Figure 3.8.

Figure 3.8
Income Statement
Horizontal Analysis

	A	B	C	D
1	<i>What SUP, Inc.</i>			
2	<i>Income Statement</i>			
3	<i>For the Year Ended</i>			
4		12/31/15	12/31/16	% Change
5	Sales Revenue	\$ 850,511.65	\$ 975,814.10	15%
6	Less: Cost of Goods Sold	442,619.87	595,413.84	35%
7	Gross Margin	407,891.78	380,400.26	-7%
8	Expenses:			
9	Advertising	20,654.21	36,148.41	75%
10	Depreciation	22,000.00	22,000.00	0%
11	Interest	30,846.24	32,338.94	5%
12	Other	10,000.00	18,000.00	80%
13	Payroll	115,365.11	129,547.97	12%
14	Utilities	23,541.25	27,546.16	17%
15	Net income before taxes	185,484.97	114,818.78	-38%
16	Income taxes	65,218.98	67,000.00	3%
17	Net income	\$ 120,265.99	\$ 47,818.78	-60%

- 12 Click **File** and then click **Save As**. (Again, this preserves the original file by giving a unique name to your file.)
- 13 Change the file name to include a reference to your horizontal analysis, and then add your name to the file name using the underscore key as before. In this example, the file will be saved as ch3-01_Horizontal_Analysis_student_name (replace student_name with your name). Save your file to a location from which it can be retrieved later.
- 14 Switch to a Page Layout view. Place your name in the left section of the footer. Note that the file name is already in the right section of the footer.
- 15 Switch back to a Normal view.

- 16** Click **File** and then **Print** to make sure the worksheet will print the way you want.
- 17** Click **Print** to print your analysis.
- 18** Save your file but do not close it.

“The trends shown here are good and bad,” Nathan says. “The analysis reveals an increase in sales of 15 percent but a 35 percent increase in the costs of goods sold.”

Kyle explains that the income statement analysis reveals operational and profitability performance and trends while the balance sheet reflects financial stability and solvency trends. The horizontal analysis on the balance sheet compares current balances for each asset, liability, and equity element with the same element in the prior period.

To create a horizontal analysis on a balance sheet:

- 1** Click the **Home** tab on the Ribbon and then click the **Balance Sheet** worksheet tab.
- 2** Click in cell D5 and type **% Change** as a label to the column.
- 3** Format cell D5 bold, center, bottom align, and with a bottom border.
- 4** Click in cell D7 and type the formula $=\text{(C7-B7)/B7}$; then press **[Enter]**.
- 5** Format cell D7 as Percent Style.
- 6** Use the fill-down procedure to copy the formula from D7 to D29.
- 7** Delete the formula in cells D12, D18–D21, and D26.
- 8** Format cells D17 and D29 with a top and double bottom border.
- 9** Resize column D to 93 pixels. Your completed balance sheet horizontal analysis should look like Figure 3.9.
- 10** Switch to a Page Layout view. Place your name in the left section of the footer. Note that the file name is already in the right section of the footer.
- 11** Switch back to a Normal view.
- 12** Click **File** and then **Print** to make sure the worksheet will print the way you want.
- 13** Click **Print** to print your analysis.
- 14** Save your file once again.

Figure 3.9
Balance Sheet
Horizontal Analysis

	A	B	C	D
1	<i>What SUP, Inc.</i>			
2	<i>Balance Sheet</i>			
3	<i>as of</i>			
4				
5	Assets	12/31/15	12/31/16	% Change
6	Current Assets:			
7	Cash	\$ 27,532.89	\$ 18,481.56	-33%
8	Accounts Receivable	84,245.25	102,544.24	22%
9	Inventory	125,351.45	152,154.21	21%
10	Prepaid Expenses	15,625.26	15,241.75	-2%
11	Supplies	10,245.15	6,578.24	-36%
12	Property, Plant, and Equipment:			
13	Land	120,000.00	120,000.00	0%
14	Building	300,000.00	315,000.00	5%
15	Equipment	65,000.00	70,000.00	8%
16	Less: Accumulated Depreciation	(68,000.00)	(90,000.00)	32%
17	Total	\$ 680,000.00	\$ 710,000.00	4%
18				
19	Liabilities and Stockholders' Equity			
20	Liabilities			
21	Current Liabilities:			
22	Accounts Payable	\$ 50,182.10	\$ 82,305.11	64%
23	Notes Payable	\$ 25,000.00	\$ 19,000.00	-24%
24	Payroll Liabilities	2,120.54	8,178.75	286%
25	Long-Term Debt	400,000.00	350,000.00	-13%
26	Stockholders' Equity			
27	Common Stock	10,000.00	10,000.00	0%
28	Retained Earnings	192,697.36	240,516.14	25%
29	Total	\$ 680,000.00	\$ 710,000.00	4%
30				

“I’m a little concerned about the 22 percent growth in accounts receivable, the 21 percent growth in inventory, and the 33 percent decrease in cash,” Meagan says. Kyle reminds her that, when those events occurred, long-term debt decreased 13 percent and retained earnings increased 25 percent. “Excel can also provide some graphical evidence of these trends by creating column charts using the chart wizard,” Kyle says.

Column Charts

Previously you created a pie chart of expenses using Excel’s Chart Wizard. Now it is time to create a column chart comparing expenses from one period to the next. This column chart will illustrate expenses side by side for the two years ended December 31, 2015, and December, 31, 2016.

To create a column chart comparing expenses:

- 1 Click the **Income Statement** worksheet tab.
- 2 Select cells **A9** through **C14** (expenses for both periods).
- 3 Click the **Insert** tab on the Ribbon and then click the **Column** chart tool from the Charts group.
- 4 Select **3-D Column** as the chart type as shown in Figure 3.10.

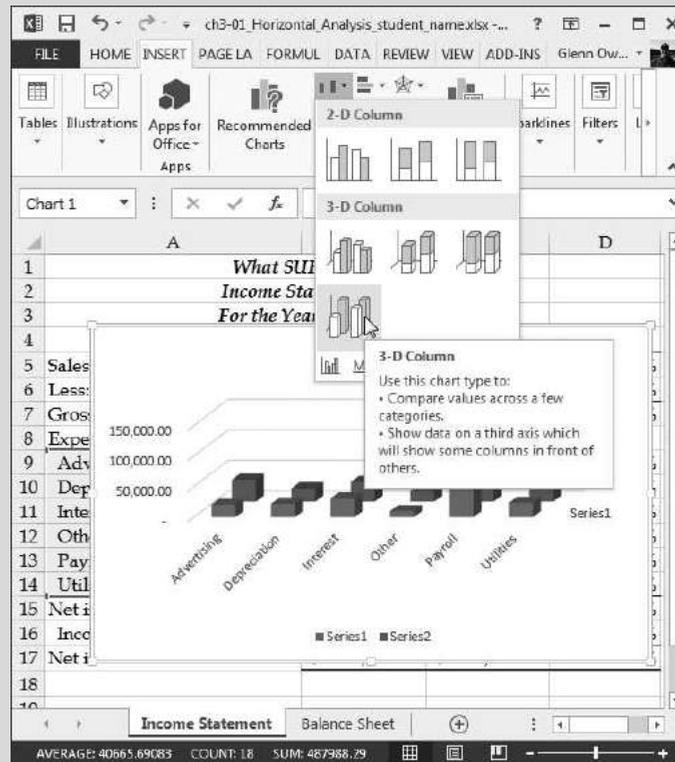
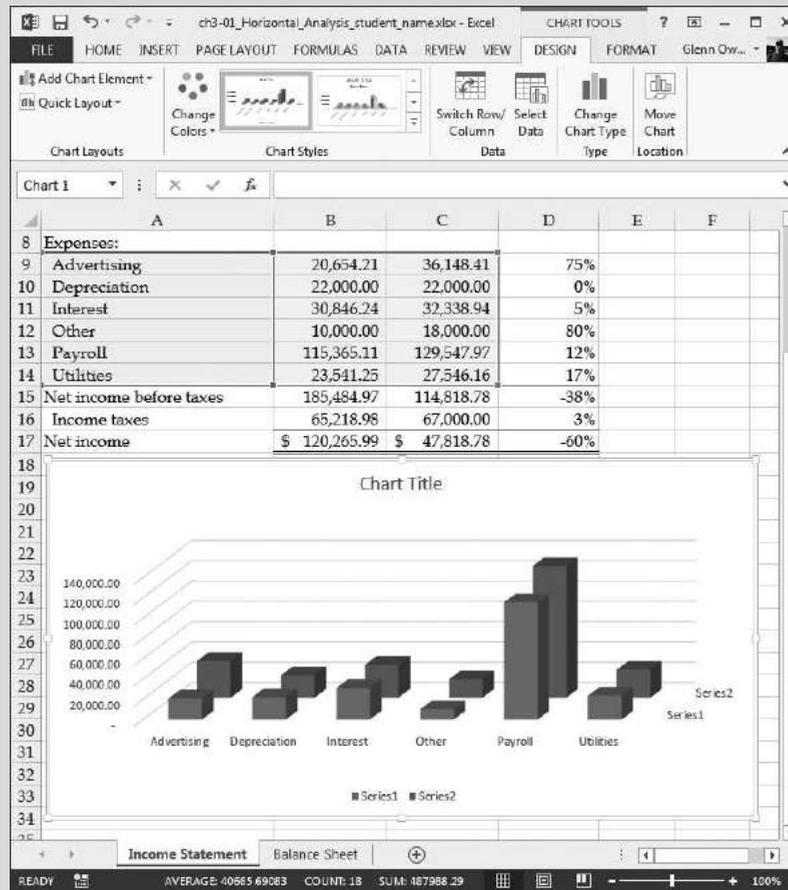


Figure 3.10

Creating a Column Chart

- 5 Click and hold down the mouse on the top border of the chart created; then move the chart to a location below the data.
- 6 Scroll down the worksheet so that row 8 is at the top of your screen and the chart is fully visible, as shown in Figure 3.11.

Figure 3.11
Modifying a Column Chart



- 7** Note that the Design tab is now selected and Chart Tools are visible in the Ribbon.
- 8** Click **Select Data** from the Data group.
- 9** Click **Series1** from the Legend Entries (Series) section (see Figure 3.12).

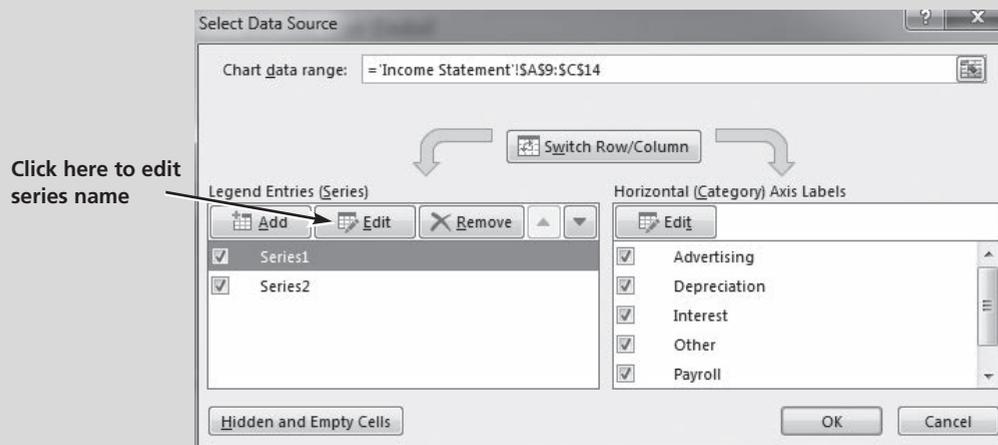


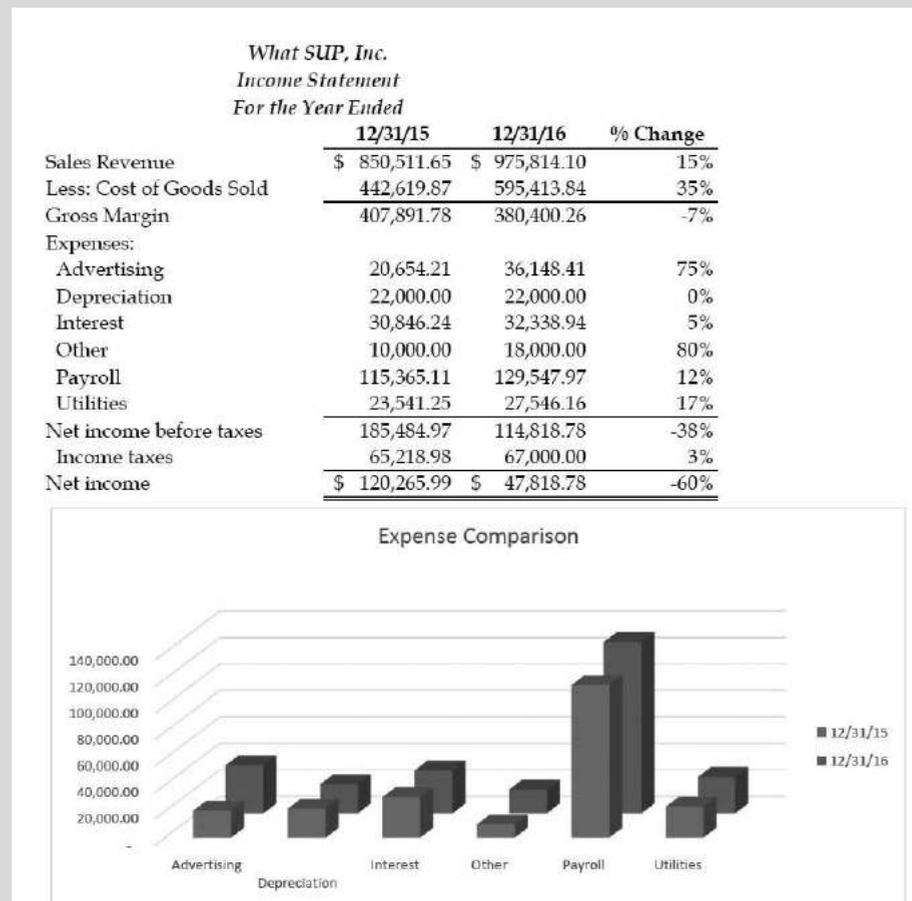
Figure 3.12

Editing a Data Source

- 10** Click **Edit**.
- 11** Click inside the **Series name** text box and the click in cell **B4**. This should enter the formula =“Income Statement”!\$B\$4 the Series name text box. Click **OK**.
- 12** Click **Series2** from the Legend Entries (Series) section.
- 13** Click **Edit**.
- 14** Click inside the **Series name** text box and the click in cell **C4**. This should enter the formula =“Income Statement”!\$C\$4 into the Series name text box. Click **OK**.
- 15** Click **OK** again in the Select Data Source window.
- 16** Click **Quick Layout** from the Charts Layouts group and then Click **Layout 1**. Your window may look different if it is sized larger. If so just select Layout 1 from the Chart Layouts group.
- 17** Type **Expense Comparison** as the new chart title.
- 18** Click **File** and then click **Save As**.
- 19** Change the file name to include a reference to column charts, and add your name to the file name using the underscore key as you have done previously. In this example, the file will be saved as ch3-01_Column_Chart_student_name (replace student_name with your name). Be sure to save your file to a location that you can access later.
- 20** Click **File** and then click **Print**, and, then click **Print** again to print the worksheet with the chart. Your printout should look like Figure 3.13.

Figure 3.13

Printed Income Statement
with Expense Comparison
Chart



21 Save your work again.

“All of this is very interesting,” says Nathan. “I’ll bet there’s more. Am I right?” “Yes, we still need to do a ratio analysis in order to complete our financial statement analyses portfolio,” Kyle responds.

Ratio Analysis

Kyle explains that several standard ratios are often used to assess a company’s profitability, liquidity, and solvency. Profitability represents the company’s ability to generate a profit to investors. Liquidity represents the company’s ability to pay its bills currently. Solvency represents the company’s ability to stay in business given its debt structure. A chart of each ratio’s formula follows.

Profitability

Return on owners' investment	$\text{Net income} \div \text{Average stockholders' equity}$
Return on total investment	$\text{Net income before interest expense} \div \text{Average total assets}$
Profit margin	$\text{Net income} \div \text{Sales}$
Gross margin	$\text{Gross margin} \div \text{Sales}$

Liquidity

Current ratio	$\text{Current assets} \div \text{Current liabilities}$
Quick ratio	$(\text{Cash} + \text{Accounts receivable} + \text{Short-term investments}) \div \text{Current liabilities}$
Receivable turnover	$\text{Sales} \div \text{Average accounts receivable}$
Inventory turnover	$\text{Cost of goods sold} \div \text{Average inventory}$

Solvency

Debt-to-equity Liability	$\text{Total liabilities} \div \text{Total equity}$
	$\text{Total liabilities} \div \text{Total assets}$

In Excel, each of these amounts is a part of a given financial statement or can easily be computed. Therefore, you can create a new worksheet that has formulas referencing these amounts. Kyle suggests you create a new worksheet to compute these ratios.

To calculate the first financial ratio on a new worksheet (refer to preceding ratio table for the *return on owners' investment* formula):

- 1** Right-click the **Income Statement** tab of your workbook and click **Insert . . .**; then click **Worksheet** and then **OK** to insert a new worksheet.
- 2** Double-click the **Sheet1** tab and rename the worksheet **Ratio Analysis**.
- 3** Format the Ratio Analysis worksheet like Figure 3.14 with a heading and listing of ratios as shown. To center and merge the title, select the range of cells **A1:B1** and then click the **Merge and Center** button from the Alignment group on the Home tab of the Ribbon. Repeat these steps for the ranges **A2:B2** and **A3:B3**.
- 4** Click in cell **B6** and type the following **=‘Income Statement’!C17/((‘Balance Sheet’!B27+‘Balance Sheet’!B28+‘Balance Sheet’!C27+‘Balance Sheet’!C28)/2)** to compute return on owners' investment.
- 5** Alternatively, you could utilize multiple worksheet referencing. Type **=** in cell **B6**, then activate the income statement worksheet and click cell **C17**.
- 6** Type **/((** (the forward slash and two left parentheses, which determine the all-important *order* of calculation).
- 7** Activate the balance sheet worksheet and click cell **B27**.
- 8** Type **+**, then click cell **C27**.
- 9** Type **+**, then click cell **B28**.
- 10** Type **+**, then click cell **C28**.

Figure 3.14
Format for Ratio Analysis

	A	B	C
1	What SUP, Inc.		
2	Ratio Analysis		
3	Dec-2016		
4			
5	Profitability		
6	Return on owners' investment		
7	Return on total investment		
8	Profit margin		
9	Gross margin		
10	Liquidity		
11	Current ratio		
12	Quick ratio		
13	Receivable turnover		
14	Inventory turnover		
15	Solvency		
16	Debt-to-equity		
17	Liability		
18			

- 11** Type $) / 2$ to end the summation of equity accounts and divide the result by 2 to derive an average.
- 12** Press [Enter] to end your formula.
- 13** Format cell B6 in a percent style.

Trouble? If you choose to type the formula as written here and forget an apostrophe or exclamation point or misspell a word, then Excel will give you an error message and you'll have to debug your formula. Also, if you don't have the correct number of parentheses, Excel will give you an error message. Note that when you edit the formula, Excel changes the color of each set of parentheses so that you can clearly see which is which. Also be careful when typing formulas to use the apostrophe and not the accent key to create formulas. The apostrophe key is usually located next to the Enter key on your keyboard, and the accent key is usually located above the Tab key.

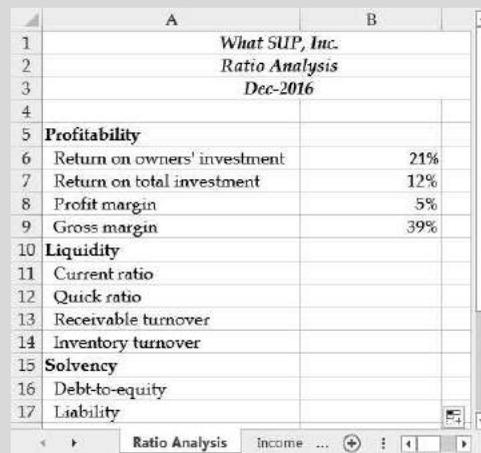
“The point-and-click method of cell referencing on multiple worksheets is sure easier than typing the references themselves,” you comment. “Otherwise I would have to type all of those apostrophes and exclamation points. With my typing skills, I would probably forget one of them and create an error in the formula.”

“Good point,” Kyle says. “Let's finish the profitability ratios next.”

To enter remaining formulas for profitability analysis (refer to the ratio table for these formulas):

- 1** Click cell B7 and type =.
- 2** Use the values at cells C17 and C11 on the income statement to compute net income before interest expense, which is the numerator of the *return on total investment ratio*.

- 3 Use the values at cells B17 and C17 on the balance sheet to add total assets, and then divide the result by 2 to obtain average total assets.
- 4 Once your formula is typed, press [Enter] to compute the ratio. Your formula should look like this: $=('Income\ Statement'!C17+ 'Income\ Statement'!C11)/(('Balance\ Sheet'!B17+ 'Balance\ Sheet'!C17)/2)$. Be careful to use the correct parentheses.
- 5 Format the cell in percent style.
- 6 In cell B8, use the values at cells C16 and C5 on the income statement to compute the *profit margin*. (Use the ratio table to enter the appropriate formula.) Your formula should look like this: $= 'Income\ Statement'!C17/ 'Income\ Statement'!C5$.
- 7 Format the cell in percent style.
- 8 In cell B9, use the values at cells C7 and C5 on the income statement to compute the *gross margin*. (Use the ratio table to enter the appropriate formula.) Your formula should look like this: $= 'Income\ Statement'!C7/ 'Income\ Statement'!C5$.
- 9 Format the cell in percent style. Your window should look like Figure 3.15.



	A	B
1	What SUP, Inc.	
2	Ratio Analysis	
3	Dec-2016	
4		
5	Profitability	
6	Return on owners' investment	21%
7	Return on total investment	12%
8	Profit margin	5%
9	Gross margin	39%
10	Liquidity	
11	Current ratio	
12	Quick ratio	
13	Receivable turnover	
14	Inventory turnover	
15	Solvency	
16	Debt-to-equity	
17	Liability	

Figure 3.15

Profitability Analysis
Completed

- 10 Click **File** then click **Save As**.
- 11 Change the file name to include a reference to ratios, and then add your name to the file name using the underscore key as before. In this example, the file will be saved as ch3-01_Ratios_student_name (replace student_name with your name). Be sure to save your file to a safe location.

Remember, profitability ratios measure the company's ability to generate a profit to investors. In this case, Nathan and Meagan are fairly satisfied with their profitability in comparison to other companies of their size and type of business. They are eager to see if their liquidity ratios are equally as positive.

Kyle encourages you to continue with your ratio analysis.

To compute the liquidity ratios:

- 1** In cell B11, use the values in cells C7 through C11 (current assets) and C22 through C23 (current liabilities) on the balance sheet to compute the *current ratio*. (Use the ratio table to find the appropriate formula.) Your formula could be **=('Balance Sheet'!C7+'Balance Sheet'!C8+'Balance Sheet'!C9+'Balance Sheet'!C10+'Balance Sheet'!C11)/('Balance Sheet'!C22+'Balance Sheet'!C23+'Balance Sheet'!C24)**, where current assets and current liabilities are added up separately; or you could use the SUM function and write the formula as **=SUM('Balance Sheet'!C7:C11)/SUM('Balance Sheet'!C22:C24)**.
- 2** Format the cell in comma style.
- 3** In cell B12, use the values in cells C7–C8 (cash and accounts receivable) and C22–C23 (current liabilities) on the balance sheet to compute the *quick ratio*. (Refer to the ratio table for the appropriate formula.) Your formula could be either **=('Balance Sheet'!C7+'Balance Sheet'!C8)/('Balance Sheet'!C22+'Balance Sheet'!C23+'Balance Sheet'!C24)** or **=SUM('Balance Sheet'!C7:C8)/SUM('Balance Sheet'!C22:C24)**.
- 4** Format the cell in comma style.
- 5** In cell B13, use the values in cell C5 (sales revenue) on the income statement and cells B8 and C8 (accounts receivable) on the balance sheet to compute the *receivable turnover* ratio. (Use the ratio table to find the appropriate formula.) Your formula should look like this: **=('Income Statement'!C5)/(('Balance Sheet'!B8+'Balance Sheet'!C8)/2)**.
- 6** Format the cell in comma style.
- 7** In cell B14, use the values in cell C6 (cost of goods sold) on the income statement and cells B9 and C9 (inventory) on the balance sheet to compute the *inventory turnover* ratio. (Use the ratio table to find the appropriate formula.) Your formula should look like this: **=('Income Statement'!C6)/(('Balance Sheet'!B9+'Balance Sheet'!C9)/2)**.
- 8** Format the cell in comma style.
- 9** Save your work.

Remember, the liquidity ratios measure the company's ability to pay its bills currently. In this case, Nathan and Meagan are surprised at how good their current and quick ratios are. Usually, their current ratio is around 2:1, which is

normal. The 2.69 current ratio and the 1.11 quick ratio indicate they have plenty of resources to meet their current liabilities. Receivable turnover is a little low, given they have 30-day credit terms, but this is still a healthy report. Inventory turnover is a little slow at 4.29, but this is fairly common in their business. They are eager to see if the solvency ratios continue the favorable trend.

To compute the solvency ratios:

- 1 In cell B16, use the values in cells C22 through C25 (accounts payable, notes payable, payroll liabilities, and long-term debt) and C26 and C27 (common stock and retained earnings) on the balance sheet to compute the *debt-to-equity* ratio. (Refer to the ratio table for the appropriate formula.) Your formula should look like this: **=SUM('Balance Sheet'!C22:C25)/SUM('Balance Sheet'!C27:C28)**.
- 2 Format the cell in percent style.
- 3 In cell B17, use the values in cells C22 through C25 (accounts payable, notes payable, payroll liabilities, and long-term debt) and C17 (total assets) on the balance sheet to compute the *liability* ratio. (Refer to the ratio table for the appropriate formula.) Your formula should look like this: **=SUM('Balance Sheet'!C22:C25)/'Balance Sheet'!C17**.
- 4 Format the cell in percent style. Your completed work should look like Figure 3.16.

	A	B	C	D	E	F
1	What SUP, Inc.					
2	Ratio Analysis					
3	Dec-2016					
4						
5	Profitability					
6	Return on owners' investment		21%			
7	Return on total investment		12%			
8	Profit margin		5%			
9	Gross margin		39%			
10	Liquidity					
11	Current ratio		2.69			
12	Quick ratio		1.11			
13	Receivable turnover		10.45			
14	Inventory turnover		4.29			
15	Solvency					
16	Debt-to-equity		183%			
17	Liability		65%			
18						

Figure 3.16

Completed Ratio Analysis

- 5 Save your work.

Now the news is not as good. It turns out the positive liquidity ratio is somewhat offset by the solvency ratios, which indicate that debt is 183 percent of equity. The company is financed heavily with debt, and this can lead to problems if the return on investment doesn't exceed the cost of the debt. The liability ratio reflects the same problem in that 65 percent of the company's assets are financed with debt versus equity. Nathan's business plan calls for a reduction in debt over the next several years as profits provide the necessary cash.

“This is great,” Meagan says. “Although the solvency ratios are high, they do reflect our business plan. As long as we continue to generate profits and cash flow, we should be able to improve the solvency ratios.”

End Note

You’ve applied some of what you learned in the first two chapters to create a set of useful worksheets that identify trends and relationships. Plus you’ve created them in a reusable format for future periods.

In the next chapter, you will learn how to use Excel to perform depreciation calculations and prepare depreciation schedules.

Chapter 3 Questions

- 1 What is another term for vertical analysis?
- 2 What base amount is used for vertical analysis of an income statement?
- 3 What base amount is used for vertical analysis of a balance sheet?
- 4 What base amount is used for horizontal analysis of both income statements and balance sheets? Give an example.
- 5 What do profitability ratios represent?
- 6 What do liquidity ratios represent?
- 7 What do solvency ratios represent?
- 8 Why is the point-and-click method of cell referencing easier than typing references directly into worksheet cells?
- 9 Which ratios are usually formatted as percentages?
- 10 Which ratios are usually formatted as numbers?

Chapter 3 Assignments

- 1 Create a Financial Analysis for What SUP, Inc. as of December 31, 2016.

You are to create this financial analysis as of December 31, 2016, from the information found on file ch3-02.xls. This file contains three worksheets, which are labeled Income Statement, Balance Sheet, and Ratios.

Following the Chapter 3 examples, create a vertical analysis of both the income statement and balance sheet for December 31, 2016, only. Then create a horizontal analysis of both the income statement and balance sheet. (*Note:* The horizontal analysis will compare December 31, 2015, with December 31, 2016.) In addition, create a pie chart of expenses for the year ended December 31, 2016; a column chart (in a format of your choice) of expenses for the years ended December 31, 2015, and 2016; and a ratio analysis as of December 31, 2016. Save the file as ch3-02_student_name.xls (replacing student_name with your name).

- a. Print each completed worksheet in Value view, with your name and date printed in the lower left footer and the file name in the lower right footer.
- b. Print each completed worksheet in Formula view, with your name and date printed in the lower left footer and the file name in the lower right footer.

- 2 Create a Financial Analysis for What SUP, Inc. as of December 31, 2017.

You are to create What SUP's financial analysis as of December 31, 2017, from the information found on file ch3-03.xls. This file contains three worksheets, which are labeled Income Statement, Balance Sheet, and Ratios.

Following the Chapter 3 examples, create a vertical analysis of both the income statement and balance sheet for December 31, 2017, only. Then create a horizontal analysis of both the income statement and balance sheet. (*Note:* The horizontal analysis will compare December 31, 2016, with December 31, 2017.) In addition, create a pie chart of expenses for the year ended December 31, 2016; a column chart (in a format of your choice) of expenses for the years ended December 31, 2016, and 2017; and a ratio analysis as of December 31, 2018. Save the file as ch3-03_student_name.xls (replacing student_name with your name).

- a. Print each completed worksheet in Value view, with your name and date printed in the lower left footer and the file name in the lower right footer.
- b. Print each completed worksheet in Formula view, with your name and date printed in the lower left footer and the file name in the lower right footer.

Chapter 3 Case Problem 1:

KELLY'S BOUTIQUE

You are to create Kelly's Boutique's financial analyses as of December 31, 2014, and as of December 31, 2015. Following the Chapter 3 examples, use the student file ch3-04.xls to create a vertical and horizontal analysis of the balance sheet and income statement in the columns provided. (*Note:* The horizontal analysis will compare December 31, 2014, with December 31, 2015.) Also create a pie chart of expenses for the year ended December 31, 2015; a column chart of expenses for the years ended December 31, 2014, and December 31, 2015; and a ratio analysis as of December 31, 2015. Save the file as ch3-04_student_name.xls (replacing student_name with your name).

- a. Print each completed worksheet in Value view, with your name and date printed in the lower left footer and the file name in the lower right footer.
- b. Print each completed worksheet in Formula view, with gridlines and row and column headings, portrait orientation, scaling to fit to 1 page wide by 1 page tall, and with your name and date printed in the lower left footer and the file name in the lower right footer.

Chapter 3 Case Problem 2:

WINE DEPOT

You are to create Wine Depot's financial analyses as of December 31, 2015, and as of December 31, 2016. Following the Chapter 3 examples, use the student file ch3-05.xls to create a vertical and horizontal analysis of the balance sheet and income statement in the columns provided. (*Note:* The horizontal analysis will compare December 31, 2015 with December 31, 2016.) Also create a pie chart of expenses for the year ended December 31, 2016; a column chart of expenses for the years ended December 31, 2015, and December 31, 2016; and a ratio analysis as of December 31, 2016. Save the file as ch3-05_student_name.xls (replacing student_name with your name). *Note:* You will have to use Excel's help feature to create the column chart, because the columns are not adjacent to one another as in the chapter example. Use whatever chart layout you prefer.

- a. Print each completed worksheet in Value view, with landscape orientation, scaling to fit to 1 page wide by 1 page tall, and with your name and date printed in the lower left footer and the file name in the lower right footer. Use Excel's help feature to move charts on your worksheet so that they print on a separate page.
- b. Print each completed worksheet in Formula view, with gridlines and row and column headings, landscape orientation, scaling to fit to 1 page wide by 1 page tall, and with your name and date printed in the lower left footer and the file name in the lower right footer.

Chapter 3 Case Problem 3:

SNICK'S BOARD SHOP

You are to create a financial analysis for Snick's Board Shop as of December 31, 2011, and December 31, 2012. Following the Chapter 3 examples, use the student file ch3-06.xls to create a vertical and horizontal analysis of the balance sheet and income statement in the columns provided. (*Note:* The horizontal analysis will compare December 31, 2011, with December 31, 2012.) Also create a pie chart of expenses for the year ended December 31, 2012, formatted in a manner similar to your chapter work; a column chart of expenses for the years ended December 31, 2011, and December 31, 2012, formatted in a manner similar to your chapter work; and a ratio analysis as of December 31, 2012. Save the file as ch3-06_student_name.xls (replacing student_name with your name). *Note:* You will have to use Excel's help feature to create the column chart, because the columns are not adjacent to one another as in the chapter example. Use whatever chart layout you prefer.

- a. Print each completed worksheet in Value view, with landscape orientation, scaling to fit to 1 page wide by 1 page tall, and with your name and date printed in the lower left footer and the file name in the lower right footer.

- b. Print each completed worksheet in Formula view, with gridlines and row and column headings, landscape orientation, scaling to fit to 1 page wide by 1 page tall, and with your name and date printed in the lower left footer and the file name in the lower right footer.

Chapter 3 Case Problem 4:

ROSEY'S ROSES

You are to create a financial analysis for Rosey's Roses as of December 31, 2013, and December 31, 2014. Following the Chapter 3 examples, use the student file ch3-07.xls to create a vertical analysis of the balance sheet and income statement as of December 31, 2013, and December 31, 2014—as well as a horizontal analysis of both the income statement and balance sheet comparing December 31, 2013, with December 31, 2014. Place the vertical analysis in columns D and G on the income statement labeled % of Sales in cells D5 and G5. Place the vertical analysis in columns D and G on the balance sheet labeled % of Assets in cells D5 and G5. Place the horizontal analysis in column I labeled % Change in cell I5 for both the income statement and balance sheet.

Also create a pie chart of expenses for the year ended December 31, 2014, formatted in a manner similar to your chapter work; a column chart of expenses for the years ended December 31, 2013, and December 31, 2014, formatted in a manner similar to your chapter work; and a ratio analysis as of December 31, 2014. *Note:* You will have to use Excel's help feature to create the column chart, because the columns are not adjacent to one another as in the chapter example. Use whatever chart layout you prefer.

Save the workbook as ch3-07_student_name (replacing student_name with your name). Print all worksheets in Value view, with your name and date printed in the lower left footer and the file name in the lower right footer.