CHAPTER 2
FINANCIAL STATEMENTS AND CASH FLOW

Solutions to Questions and Problems

NOTE: All end-of-chapter problems were solved using a spreadsheet. Many problems require multiple steps. Due to space and readability constraints, when these intermediate steps are included in this solutions manual, rounding may appear to have occurred. However, the final answer for each problem is found without rounding during any step in the problem.

Basic

1. To find owners’ equity, we must construct a balance sheet as follows:

<table>
<thead>
<tr>
<th></th>
<th>CA</th>
<th>CL</th>
<th>NFA</th>
<th>LTD</th>
<th>OE</th>
</tr>
</thead>
<tbody>
<tr>
<td>Balance Sheet</td>
<td>$5,700</td>
<td>$4,400</td>
<td>27,000</td>
<td>12,900</td>
<td>??</td>
</tr>
<tr>
<td>TA</td>
<td>$32,700</td>
<td>TL &amp; OE</td>
<td>$32,700</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

We know that total liabilities and owners’ equity (TL & OE) must equal total assets of $32,700. We also know that TL & OE is equal to current liabilities plus long-term debt plus owners’ equity, so owners’ equity is:

\[ OE = \$32,700 - 12,900 - 4,400 = \$15,400 \]

\[ NWC = CA - CL = \$5,700 - 4,400 = \$1,300 \]

2. The income statement for the company is:

<table>
<thead>
<tr>
<th>Income Statement</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Sales</td>
<td>$387,000</td>
</tr>
<tr>
<td>Costs</td>
<td>175,000</td>
</tr>
<tr>
<td>Depreciation</td>
<td>40,000</td>
</tr>
<tr>
<td>EBIT</td>
<td>$172,000</td>
</tr>
<tr>
<td>Interest</td>
<td>21,000</td>
</tr>
<tr>
<td>EBT</td>
<td>$151,000</td>
</tr>
<tr>
<td>Taxes</td>
<td>52,850</td>
</tr>
<tr>
<td>Net income</td>
<td>$ 98,150</td>
</tr>
</tbody>
</table>
One equation for net income is:

Net income = Dividends + Addition to retained earnings

Rearranging, we get:

Addition to retained earnings = Net income – Dividends
Addition to retained earnings = $98,150 – 30,000
Addition to retained earnings = $68,150

3. To find the book value of current assets, we use: NWC = CA – CL. Rearranging to solve for current assets, we get:

CA = NWC + CL = $800,000 + 2,400,000 = $3,200,000

The market value of current assets and net fixed assets is given, so:

<table>
<thead>
<tr>
<th>Book value</th>
<th>Market value</th>
</tr>
</thead>
<tbody>
<tr>
<td>CA</td>
<td>$3,200,000</td>
</tr>
<tr>
<td>NFA</td>
<td>$5,200,000</td>
</tr>
<tr>
<td>Assets</td>
<td>$8,400,000</td>
</tr>
</tbody>
</table>

4. Taxes = 0.15($50,000) + 0.25($25,000) + 0.34($25,000) + 0.39($273,000 – 100,000)
Taxes = $89,720

The average tax rate is the total tax paid divided by taxable income, so:

Average tax rate = $89,720 / $273,000
Average tax rate = 32.86%

The marginal tax rate is the tax rate on the next $1 of earnings, so the marginal tax rate = 39%.

5. To calculate OCF, we first need the income statement:

<table>
<thead>
<tr>
<th>Income Statement</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Sales</td>
<td>$18,700</td>
</tr>
<tr>
<td>Costs</td>
<td>10,300</td>
</tr>
<tr>
<td>Depreciation</td>
<td>1,900</td>
</tr>
<tr>
<td>EBIT</td>
<td>$6,500</td>
</tr>
<tr>
<td>Interest</td>
<td>1,250</td>
</tr>
<tr>
<td>Taxable income</td>
<td>$5,250</td>
</tr>
<tr>
<td>Taxes</td>
<td>2,100</td>
</tr>
<tr>
<td>Net income</td>
<td>$3,150</td>
</tr>
</tbody>
</table>

OCF = EBIT + Depreciation – Taxes
OCF = $6,500 + 1,900 – 2,100
OCF = $6,300

6. Net capital spending = NFA_{end} – NFA_{beg} + Depreciation
Net capital spending = $1,690,000 – 1,420,000 + 145,000
Net capital spending = $415,000
7. The long-term debt account will increase by $35 million, the amount of the new long-term debt issue. Since the company sold 10 million new shares of stock with a $1 par value, the common stock account will increase by $10 million. The capital surplus account will increase by $48 million, the value of the new stock sold above its par value. Since the company had a net income of $9 million, and paid $2 million in dividends, the addition to retained earnings was $7 million, which will increase the accumulated retained earnings account. So, the new long-term debt and stockholders’ equity portion of the balance sheet will be:

<table>
<thead>
<tr>
<th>Long-term debt</th>
<th>$100,000,000</th>
</tr>
</thead>
<tbody>
<tr>
<td>Total long-term debt</td>
<td>$100,000,000</td>
</tr>
</tbody>
</table>

Shareholders’ equity:

<table>
<thead>
<tr>
<th>Preferred stock</th>
<th>$4,000,000</th>
</tr>
</thead>
<tbody>
<tr>
<td>Common stock ($1 par value)</td>
<td>25,000,000</td>
</tr>
<tr>
<td>Accumulated retained earnings</td>
<td>142,000,000</td>
</tr>
<tr>
<td>Capital surplus</td>
<td>93,000,000</td>
</tr>
<tr>
<td>Total equity</td>
<td>$264,000,000</td>
</tr>
<tr>
<td>Total Liabilities &amp; Equity</td>
<td>$364,000,000</td>
</tr>
</tbody>
</table>

8. Cash flow to creditors = Interest paid – Net new borrowing
Cash flow to creditors = $127,000 – (LTD_{end} – LTD_{beg})
Cash flow to creditors = $127,000 – ($1,520,000 – 1,450,000)
Cash flow to creditors = $127,000 – 70,000
Cash flow to creditors = $57,000

9. Cash flow to stockholders = Dividends paid – Net new equity
Cash flow to stockholders = $275,000 – [(Common_{end} + APIS_{end}) – (Common_{beg} + APIS_{beg})]
Cash flow to stockholders = $275,000 – [$525,000 + 3,700,000] – ($490,000 + 3,400,000)]
Cash flow to stockholders = $275,000 – ($4,225,000 – 3,890,000)
Cash flow to stockholders = –$60,000

Note, APIS is the additional paid-in surplus.

10. Cash flow from assets = Cash flow to creditors + Cash flow to stockholders
= $57,000 – 60,000
= –$3,000

Cash flow from assets = OCF – Change in NWC – Net capital spending
= OCF – ($87,000) – 945,000
= $855,000

Operating cash flow = –$3,000 – 87,000 + 945,000
= $855,000
Intermediate

11. a. The accounting statement of cash flows explains the change in cash during the year. The accounting statement of cash flows will be:

**Statement of cash flows**

*Operations*
- Net income $95
- Depreciation 90
- Changes in other current assets (5)
- Change in accounts payable 10
- Total cash flow from operations $190

*Investing activities*
- Acquisition of fixed assets $(110)
- Total cash flow from investing activities $(110)

*Financing activities*
- Proceeds of long-term debt $5
- Dividends (75)
- Total cash flow from financing activities $(70)

Change in cash (on balance sheet) $10

b. Change in NWC = NWC\textsubscript{end} - NWC\textsubscript{beg}
   = (CA\textsubscript{end} - CL\textsubscript{end}) - (CA\textsubscript{beg} - CL\textsubscript{beg})
   = [($65 + 170) - 125] - [($55 + 165) - 115]
   = $110 - 105
   = $5

c. To find the cash flow generated by the firm’s assets, we need the operating cash flow, and the capital spending. So, calculating each of these, we find:

**Operating cash flow**
- Net income $95
- Depreciation 90
- Operating cash flow $185

Note that we can calculate OCF in this manner since there are no taxes.
**Capital spending**

<p>| | |</p>
<table>
<thead>
<tr>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Ending fixed assets</td>
<td>$390</td>
</tr>
<tr>
<td>Beginning fixed assets</td>
<td>(370)</td>
</tr>
<tr>
<td>Depreciation</td>
<td>90</td>
</tr>
<tr>
<td><strong>Capital spending</strong></td>
<td>$110</td>
</tr>
</tbody>
</table>

Now we can calculate the cash flow generated by the firm’s assets, which is:

**Cash flow from assets**

<p>| | |</p>
<table>
<thead>
<tr>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Operating cash flow</td>
<td>$185</td>
</tr>
<tr>
<td>Capital spending</td>
<td>(110)</td>
</tr>
<tr>
<td>Change in NWC</td>
<td>(5)</td>
</tr>
<tr>
<td><strong>Cash flow from assets</strong></td>
<td>$70</td>
</tr>
</tbody>
</table>

12. With the information provided, the cash flows from the firm are the capital spending and the change in net working capital, so:

**Cash flows from the firm**

<p>| | |</p>
<table>
<thead>
<tr>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Capital spending</td>
<td>$(21,000)</td>
</tr>
<tr>
<td>Additions to NWC</td>
<td>(1,900)</td>
</tr>
<tr>
<td><strong>Cash flows from the firm</strong></td>
<td>$(22,900)</td>
</tr>
</tbody>
</table>

And the cash flows to the investors of the firm are:

**Cash flows to investors of the firm**

<p>| | |</p>
<table>
<thead>
<tr>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Sale of long-term debt</td>
<td>(17,000)</td>
</tr>
<tr>
<td>Sale of common stock</td>
<td>(4,000)</td>
</tr>
<tr>
<td>Dividends paid</td>
<td>14,500</td>
</tr>
<tr>
<td><strong>Cash flows to investors of the firm</strong></td>
<td>$(6,500)</td>
</tr>
</tbody>
</table>
13. a. The interest expense for the company is the amount of debt times the interest rate on the debt. So, the income statement for the company is:

Income Statement

<table>
<thead>
<tr>
<th>Item</th>
<th>Amount</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sales</td>
<td>$1,060,000</td>
</tr>
<tr>
<td>Cost of goods</td>
<td>$525,000</td>
</tr>
<tr>
<td>sold</td>
<td></td>
</tr>
<tr>
<td>Selling costs</td>
<td>$215,000</td>
</tr>
<tr>
<td>Depreciation</td>
<td>$130,000</td>
</tr>
<tr>
<td>EBIT</td>
<td>$190,000</td>
</tr>
<tr>
<td>Interest</td>
<td>$56,000</td>
</tr>
<tr>
<td>Taxable income</td>
<td>$134,000</td>
</tr>
<tr>
<td>Taxes</td>
<td>$46,900</td>
</tr>
<tr>
<td>Net income</td>
<td>$87,100</td>
</tr>
</tbody>
</table>

b. And the operating cash flow is:

\[ \text{OCF} = \text{EBIT} + \text{Depreciation} - \text{Taxes} \]
\[ \text{OCF} = 190,000 + 130,000 - 46,900 \]
\[ \text{OCF} = 273,100 \]

14. To find the OCF, we first calculate net income.

Income Statement

<table>
<thead>
<tr>
<th>Item</th>
<th>Amount</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sales</td>
<td>$185,000</td>
</tr>
<tr>
<td>Costs</td>
<td>$98,000</td>
</tr>
<tr>
<td>Other expenses</td>
<td>$6,700</td>
</tr>
<tr>
<td>Depreciation</td>
<td>$16,500</td>
</tr>
<tr>
<td>EBIT</td>
<td>$63,800</td>
</tr>
<tr>
<td>Interest</td>
<td>$9,000</td>
</tr>
<tr>
<td>Taxable income</td>
<td>$54,800</td>
</tr>
<tr>
<td>Taxes</td>
<td>$19,180</td>
</tr>
<tr>
<td>Net income</td>
<td>$35,620</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Item</th>
<th>Amount</th>
</tr>
</thead>
<tbody>
<tr>
<td>Dividends</td>
<td>$9,500</td>
</tr>
<tr>
<td>Additions to RE</td>
<td>$26,120</td>
</tr>
</tbody>
</table>

a. \[ \text{OCF} = \text{EBIT} + \text{Depreciation} - \text{Taxes} \]
\[ \text{OCF} = 63,800 + 16,500 - 19,180 \]
\[ \text{OCF} = 61,120 \]

b. \[ \text{CFC} = \text{Interest} - \text{Net new LTD} \]
\[ \text{CFC} = 9,000 - (–7,100) \]
\[ \text{CFC} = 16,100 \]

Note that the net new long-term debt is negative because the company repaid part of its long-term debt.

c. \[ \text{CFS} = \text{Dividends} - \text{Net new equity} \]
\[ \text{CFS} = 9,500 - 7,550 \]
\[ \text{CFS} = 1,950 \]
d. We know that CFA = CFC + CFS, so:

\[ \text{CFA} = 16,100 + 1,950 = 18,050 \]

CFA is also equal to OCF – Net capital spending – Change in NWC. We already know OCF. Net capital spending is equal to:

Net capital spending = Increase in NFA + Depreciation
Net capital spending = $26,100 + 16,500
Net capital spending = $42,600

Now we can use:

\[ \text{CFA} = \text{OCF} - \text{Net capital spending} - \text{Change in NWC} \]
$18,050 = 61,120 - 42,600 - \text{Change in NWC}.

Solving for the change in NWC gives $470, meaning the company increased its NWC by $470.

15. The solution to this question works the income statement backwards. Starting at the bottom:

Net income = Dividends + Addition to retained earnings
Net income = $1,570 + 4,900
Net income = $6,470

Now, looking at the income statement:

EBT – (EBT × Tax rate) = Net income

Recognize that EBT × tax rate is simply the calculation for taxes. Solving this for EBT yields:

\[ \text{EBT} = \frac{\text{NI}}{1 - \text{Tax rate}} \]
\[ \text{EBT} = \frac{6,470}{1 - 0.35} \]
\[ \text{EBT} = 9,953.85 \]

Now we can calculate:

EBIT = EBT + Interest
EBIT = $9,953.85 + 1,840
EBIT = $11,793.85

The last step is to use:

EBIT = Sales – Costs – Depreciation
$11,793.85 = 41,000 – 26,400 – \text{Depreciation}
Depreciation = $2,806.15
16. The market value of shareholders’ equity cannot be negative. A negative market value in this case would imply that the company would pay you to own the stock. The market value of shareholders’ equity can be stated as: Shareholders’ equity = Max [(TA – TL), 0]. So, if TA is $12,400, equity is equal to $1,500, and if TA is $9,600, equity is equal to $0. We should note here that while the market value of equity cannot be negative, the book value of shareholders’ equity can be negative.

17. a. Taxes Growth = 0.15($50,000) + 0.25($25,000) + 0.34($86,000 – 75,000) = $17,490
Taxes Income = 0.15($50,000) + 0.25($25,000) + 0.34($25,000) + 0.39($235,000) + 0.34($8,600,000 – 335,000)
= $2,924,000

b. Each firm has a marginal tax rate of 34 percent on the next $10,000 of taxable income, despite their different average tax rates, so both firms will pay an additional $3,400 in taxes.

18. Income Statement

<table>
<thead>
<tr>
<th>Item</th>
<th>Amount</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sales</td>
<td>$630,000</td>
</tr>
<tr>
<td>COGS</td>
<td>470,000</td>
</tr>
<tr>
<td>A&amp;S expenses</td>
<td>95,000</td>
</tr>
<tr>
<td>Depreciation</td>
<td>140,000</td>
</tr>
<tr>
<td>EBIT</td>
<td>75,000</td>
</tr>
<tr>
<td>Interest</td>
<td>70,000</td>
</tr>
<tr>
<td>Taxable income</td>
<td>145,000</td>
</tr>
<tr>
<td>Taxes (35%)</td>
<td>0</td>
</tr>
<tr>
<td>Net income</td>
<td>(145,000)</td>
</tr>
</tbody>
</table>

a. OCF = EBIT + Depreciation – Taxes
OCF = ($75,000) + 140,000 – 0
OCF = $65,000

c. Net income was negative because of the tax deductibility of depreciation and interest expense. However, the actual cash flow from operations was positive because depreciation is a non-cash expense and interest is a financing expense, not an operating expense.

19. A firm can still pay out dividends if net income is negative; it just has to be sure there is sufficient cash flow to make the dividend payments.

Change in NWC = Net capital spending = Net new equity = 0. (Given)

Cash flow from assets = OCF – Change in NWC – Net capital spending
Cash flow from assets = $65,000 – 0 – 0 = $65,000

Cash flow to stockholders = Dividends – Net new equity
Cash flow to stockholders = $34,000 – 0 = $34,000

Cash flow to creditors = Cash flow from assets – Cash flow to stockholders
Cash flow to creditors = $65,000 – 34,000
Cash flow to creditors = $31,000
Cash flow to creditors is also:

Cash flow to creditors = Interest – Net new LTD

So:

Net new LTD = Interest – Cash flow to creditors
Net new LTD = $70,000 – 31,000
Net new LTD = $39,000

20. a. The income statement is:

<table>
<thead>
<tr>
<th>Income Statement</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Sales</td>
<td>$19,900</td>
</tr>
<tr>
<td>Cost of goods sold</td>
<td>14,200</td>
</tr>
<tr>
<td>Depreciation</td>
<td>2,700</td>
</tr>
<tr>
<td>EBIT</td>
<td>$ 3,000</td>
</tr>
<tr>
<td>Interest</td>
<td>670</td>
</tr>
<tr>
<td>Taxable income</td>
<td>$ 2,330</td>
</tr>
<tr>
<td>Taxes</td>
<td>932</td>
</tr>
<tr>
<td>Net income</td>
<td>$1,398</td>
</tr>
</tbody>
</table>

b. OCF = EBIT + Depreciation – Taxes
OCF = $3,000 + 2,700 – 932
OCF = $4,768

c. Change in NWC = NWC\text{end} – NWC\text{beg}
= (CA_{\text{end}} – CL_{\text{end}}) – (CA_{\text{beg}} – CL_{\text{beg}})
= ($5,135 – 2,535) – ($4,420 – 2,470)
= $2,600 – 1,950
= $650

Net capital spending = NFA\text{end} – NFA\text{beg} + Depreciation
= $16,770 – 15,340 + 2,700
= $4,130

CFA = OCF – Change in NWC – Net capital spending
= $4,768 – 650 – 4,130
= $12

The cash flow from assets can be positive or negative, since it represents whether the firm raised funds or distributed funds on a net basis. In this problem, even though net income and OCF are positive, the firm invested heavily in both fixed assets and net working capital; it had to raise a net $12 in funds from its stockholders and creditors to make these investments.

d. Cash flow to creditors = Interest – Net new LTD
= $670 – 0
= $670
Cash flow to stockholders = Cash flow from assets – Cash flow to creditors
= –$12 – 670
= –$682

We can also calculate the cash flow to stockholders as:

Cash flow to stockholders = Dividends – Net new equity

Solving for net new equity, we get:

Net new equity = $650 – (–682)
= $1,332

The firm had positive earnings in an accounting sense (NI > 0) and had positive cash flow from operations. The firm invested $650 in new net working capital and $4,130 in new fixed assets. The firm had to raise $12 from its stakeholders to support this new investment. It accomplished this by raising $1,332 in the form of new equity. After paying out $650 of this in the form of dividends to shareholders and $670 in the form of interest to creditors, $12 was left to meet the firm’s cash flow needs for investment.

21. a. Total assets 2011 = $936 + 4,176 = $5,112
Total liabilities 2011 = $382 + 2,160 = $2,542
Owners’ equity 2011 = $5,112 – 2,542 = $2,570

Total assets 2012 = $1,015 + 4,896 = $5,911
Total liabilities 2012 = $416 + 2,477 = $2,893
Owners’ equity 2012 = $5,911 – 2,893 = $3,018

b. NWC 2011 = CA11 – CL11 = $936 – 382 = $554
NWC 2012 = CA12 – CL12 = $1,015 – 416 = $599
Change in NWC = NWC12 – NWC11 = $599 – 554 = $45

c. We can calculate net capital spending as:

Net capital spending = Net fixed assets 2012 – Net fixed assets 2011 + Depreciation
Net capital spending = $4,896 – 4,176 + 1,150
Net capital spending = $1,870

So, the company had a net capital spending cash flow of $1,870. We also know that net capital spending is:

Net capital spending = Fixed assets bought – Fixed assets sold
$1,870 = $2,160 – Fixed assets sold
Fixed assets sold = $2,160 – 1,870
Fixed assets sold = $290
To calculate the cash flow from assets, we must first calculate the operating cash flow. The operating cash flow is calculated as follows (you can also prepare a traditional income statement):

\[
\begin{align*}
\text{EBIT} & = \text{Sales} - \text{Costs} - \text{Depreciation} \\
\text{EBIT} & = $12,380 - 5,776 - 1,150 \\
\text{EBIT} & = $5,454 \\
\text{EBT} & = \text{EBIT} - \text{Interest} \\
\text{EBT} & = $5,454 - 314 \\
\text{EBT} & = $5,140 \\
\text{Taxes} & = \text{EBT} \times .40 \\
\text{Taxes} & = $5,140 \times .40 \\
\text{Taxes} & = $2,056 \\
\text{OCF} & = \text{EBIT} + \text{Depreciation} - \text{Taxes} \\
\text{OCF} & = $5,454 + 1,150 - 2,056 \\
\text{OCF} & = $4,548 \\
\text{Cash flow from assets} & = \text{OCF} - \text{Change in NWC} - \text{Net capital spending.} \\
\text{Cash flow from assets} & = $4,548 - 45 - 1,870 \\
\text{Cash flow from assets} & = $2,633 \\
\end{align*}
\]

\[d. \quad \text{Net new borrowing} = \text{LTD}_{12} - \text{LTD}_{11} \]
\[\text{Net new borrowing} = $2,477 - 2,160 \\
\text{Net new borrowing} = $317 \\
\]
\[\text{Cash flow to creditors} = \text{Interest} - \text{Net new LTD} \\
\text{Cash flow to creditors} = $314 - 317 \\
\text{Cash flow to creditors} = -$3 \\
\]
\[\text{Net new borrowing} = $317 = \text{Debt issued} - \text{Debt retired} \\
\text{Debt retired} = $432 - 317 \\
\text{Debt retired} = $115 \]
22. 

**Balance sheet as of Dec. 31, 2011**

<table>
<thead>
<tr>
<th></th>
<th>Amount</th>
<th></th>
<th>Amount</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cash</td>
<td>$4,109</td>
<td>Accounts payable</td>
<td>$4,316</td>
</tr>
<tr>
<td>Accounts receivable</td>
<td>5,439</td>
<td>Notes payable</td>
<td>794</td>
</tr>
<tr>
<td>Inventory</td>
<td>9,670</td>
<td>Current liabilities</td>
<td>$5,110</td>
</tr>
<tr>
<td>Current assets</td>
<td>$19,218</td>
<td>Long-term debt</td>
<td>$13,460</td>
</tr>
<tr>
<td>Net fixed assets</td>
<td>$34,455</td>
<td>Owners' equity</td>
<td>35,103</td>
</tr>
<tr>
<td>Total assets</td>
<td>$53,673</td>
<td>Total liab. &amp; equity</td>
<td>$53,673</td>
</tr>
</tbody>
</table>

**Balance sheet as of Dec. 31, 2012**

<table>
<thead>
<tr>
<th></th>
<th>Amount</th>
<th></th>
<th>Amount</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cash</td>
<td>$5,203</td>
<td>Accounts payable</td>
<td>$4,185</td>
</tr>
<tr>
<td>Accounts receivable</td>
<td>6,127</td>
<td>Notes payable</td>
<td>746</td>
</tr>
<tr>
<td>Inventory</td>
<td>9,938</td>
<td>Current liabilities</td>
<td>$4,931</td>
</tr>
<tr>
<td>Current assets</td>
<td>$21,268</td>
<td>Long-term debt</td>
<td>$16,050</td>
</tr>
<tr>
<td>Net fixed assets</td>
<td>$35,277</td>
<td>Owners' equity</td>
<td>35,564</td>
</tr>
<tr>
<td>Total assets</td>
<td>$56,545</td>
<td>Total liab. &amp; equity</td>
<td>$56,545</td>
</tr>
</tbody>
</table>

**2011 Income Statement**

<table>
<thead>
<tr>
<th></th>
<th>Amount</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sales</td>
<td>$7,835.00</td>
</tr>
<tr>
<td>COGS</td>
<td>2,696.00</td>
</tr>
<tr>
<td>Other expenses</td>
<td>639.00</td>
</tr>
<tr>
<td>Depreciation</td>
<td>1,125.00</td>
</tr>
<tr>
<td>EBIT</td>
<td>$3,375.00</td>
</tr>
<tr>
<td>Interest</td>
<td>525.00</td>
</tr>
<tr>
<td>EBT</td>
<td>$2,850.00</td>
</tr>
<tr>
<td>Taxes</td>
<td>969.00</td>
</tr>
<tr>
<td>Net income</td>
<td>$1,881.00</td>
</tr>
</tbody>
</table>

**2012 Income Statement**

<table>
<thead>
<tr>
<th></th>
<th>Amount</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sales</td>
<td>$8,409.00</td>
</tr>
<tr>
<td>COGS</td>
<td>3,060.00</td>
</tr>
<tr>
<td>Other expenses</td>
<td>534.00</td>
</tr>
<tr>
<td>Depreciation</td>
<td>1,126.00</td>
</tr>
<tr>
<td>EBIT</td>
<td>$3,689.00</td>
</tr>
<tr>
<td>Interest</td>
<td>603.00</td>
</tr>
<tr>
<td>EBT</td>
<td>$3,086.00</td>
</tr>
<tr>
<td>Taxes</td>
<td>1,049.24</td>
</tr>
<tr>
<td>Net income</td>
<td>$2,036.76</td>
</tr>
</tbody>
</table>

**23.**

\[
OCF = EBIT + \text{Depreciation} - \text{Taxes}
\]

\[
OCF = $3,689 + 1,126 - 1,049.24
OCF = $3,765.76
\]

\[
\text{Change in NWC} = \text{NWC}_{\text{end}} - \text{NWC}_{\text{beg}} = (\text{CA} - \text{CL})_{\text{end}} - (\text{CA} - \text{CL})_{\text{beg}}
\]

\[
\text{Change in NWC} = ($21,268 - 4,931) - ($19,218 - 5,110)
\]

\[
\text{Change in NWC} = $2,229
\]

\[
\text{Net capital spending} = \text{NFA}_{\text{end}} - \text{NFA}_{\text{beg}} + \text{Depreciation}
\]

\[
\text{Net capital spending} = $35,277 - 34,455 + 1,126
\]

\[
\text{Net capital spending} = $1,948
\]
Cash flow from assets = OCF – Change in NWC – Net capital spending
Cash flow from assets = $3,765.76 – 2,229 – 1,948
Cash flow from assets = –$411.24

Cash flow to creditors = Interest – Net new LTD
Net new LTD = LTD_{end} – LTD_{beg}
Cash flow to creditors = $603 – ($16,050 – 13,460)
Cash flow to creditors = –$1,987

Net new equity = Common stock_{end} – Common stock_{beg}
Common stock + Retained earnings = Total owners’ equity
Net new equity = (OE – RE)_{end} – (OE – RE)_{beg}
Net new equity = OE_{end} – OE_{beg} + RE_{beg} – RE_{end}
RE_{end} = RE_{beg} + Additions to RE
∴ Net new equity = OE_{end} – OE_{beg} + RE_{beg} – RE_{end} + Additions to RE
Net new equity = (OE_{end} – OE_{beg} + RE_{beg} – RE_{end} + Additions to RE)
Net new equity = $35,564 – 35,103 – 985.76 = –$524.76

Cash flow to stockholders = Dividends – Net new equity
Cash flow to stockholders = $1,051 – (–$524.76)
Cash flow to stockholders = $1,575.76

As a check, cash flow from assets is –$411.24

Cash flow from assets = Cash flow from creditors + Cash flow to stockholders
Cash flow from assets = –$1,987 + 1,575.76
Cash flow from assets = –$411.24

**Challenge**

24. We will begin by calculating the operating cash flow. First, we need the EBIT, which can be calculated as:

EBIT = Net income + Current taxes + Deferred taxes + Interest
EBIT = $173 + 98 + 19 + 48
EBIT = $338

Now we can calculate the operating cash flow as:

Operating cash flow
Earnings before interest and taxes $338
Depreciation 94
Current taxes (98)
Operating cash flow $334
The cash flow from assets is found in the investing activities portion of the accounting statement of cash flows, so:

*Cash flow from assets*

<table>
<thead>
<tr>
<th>Description</th>
<th>Amount</th>
</tr>
</thead>
<tbody>
<tr>
<td>Acquisition of fixed assets</td>
<td>$215</td>
</tr>
<tr>
<td>Sale of fixed assets</td>
<td>$(23)</td>
</tr>
<tr>
<td>Capital spending</td>
<td>$192</td>
</tr>
</tbody>
</table>

The net working capital cash flows are all found in the operations cash flow section of the accounting statement of cash flows. However, instead of calculating the net working capital cash flows as the change in net working capital, we must calculate each item individually. Doing so, we find:

*Net working capital cash flow*

<table>
<thead>
<tr>
<th>Description</th>
<th>Amount</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cash</td>
<td>$14</td>
</tr>
<tr>
<td>Accounts receivable</td>
<td>18</td>
</tr>
<tr>
<td>Inventories</td>
<td>$(22)</td>
</tr>
<tr>
<td>Accounts payable</td>
<td>$(17)</td>
</tr>
<tr>
<td>Accrued expenses</td>
<td>9</td>
</tr>
<tr>
<td>Notes payable</td>
<td>$(6)</td>
</tr>
<tr>
<td>Other</td>
<td>$(3)</td>
</tr>
<tr>
<td>NWC cash flow</td>
<td>$(7)</td>
</tr>
</tbody>
</table>

Except for the interest expense and notes payable, the cash flow to creditors is found in the financing activities of the accounting statement of cash flows. The interest expense from the income statement is given, so:

*Cash flow to creditors*

<table>
<thead>
<tr>
<th>Description</th>
<th>Amount</th>
</tr>
</thead>
<tbody>
<tr>
<td>Interest</td>
<td>$48</td>
</tr>
<tr>
<td>Retirement of debt</td>
<td>162</td>
</tr>
<tr>
<td>Debt service</td>
<td>$210</td>
</tr>
<tr>
<td>Proceeds from sale of long-term debt</td>
<td>$(116)</td>
</tr>
<tr>
<td>Total</td>
<td>$94</td>
</tr>
</tbody>
</table>

And we can find the cash flow to stockholders in the financing section of the accounting statement of cash flows. The cash flow to stockholders was:

*Cash flow to stockholders*

<table>
<thead>
<tr>
<th>Description</th>
<th>Amount</th>
</tr>
</thead>
<tbody>
<tr>
<td>Dividends</td>
<td>$ 86</td>
</tr>
<tr>
<td>Repurchase of stock</td>
<td>13</td>
</tr>
<tr>
<td>Cash to stockholders</td>
<td>$ 99</td>
</tr>
<tr>
<td>Proceeds from new stock issue</td>
<td>$(44)</td>
</tr>
<tr>
<td>Total</td>
<td>$ 55</td>
</tr>
</tbody>
</table>
25. Net capital spending = NFA_{end} - NFA_{beg} + Depreciation
   = (NFA_{end} - NFA_{beg}) + (Depreciation + AD_{beg}) - AD_{beg}
   = (NFA_{end} - NFA_{beg}) + AD_{end} - AD_{beg}
   = (NFA_{end} + AD_{end}) - (NFA_{beg} + AD_{beg}) = FA_{end} - FA_{beg}

26. a. The tax bubble causes average tax rates to catch up to marginal tax rates, thus eliminating the tax advantage of low marginal rates for high income corporations.

b. Assuming a taxable income of $335,000, the taxes will be:

   Taxes = 0.15($50K) + 0.25($25K) + 0.34($25K) + 0.39($235K) = $113.9K
   Average tax rate = $113.9K / $335K = 34%

   The marginal tax rate on the next dollar of income is 34 percent.

   For corporate taxable income levels of $335K to $10M, average tax rates are equal to marginal tax rates.

   Taxes = 0.34($10M) + 0.35($5M) + 0.38($3.333M) = $6,416,667
   Average tax rate = $6,416,667 / $18,333,334 = 35%

   The marginal tax rate on the next dollar of income is 35 percent. For corporate taxable income levels over $18,333,334, average tax rates are again equal to marginal tax rates.

c. Taxes = 0.34($200K) = $68K = 0.15($50K) + 0.25($25K) + 0.34($25K) + X($100K);
   X($100K) = $68K - 22.25K = $45.75K
   X = $45.75K / $100K
   X = 45.75%
CHAPTER 3
FINANCIAL STATEMENTS
ANALYSIS AND FINANCIAL MODELS

Solutions to Questions and Problems

NOTE: All end-of-chapter problems were solved using a spreadsheet. Many problems require multiple steps. Due to space and readability constraints, when these intermediate steps are included in this solutions manual, rounding may appear to have occurred. However, the final answer for each problem is found without rounding during any step in the problem.

Basic

1. ROE = (PM)(TAT)(EM)
   \[ \text{ROE} = (0.043)(1.75)(1.55) = 0.1166 \text{ or } 11.66\% \]

2. The equity multiplier is:
   \[ \text{EM} = 1 + \frac{D}{E} \]
   \[ \text{EM} = 1 + 0.80 = 1.80 \]

   One formula to calculate return on equity is:

   \[ \text{ROE} = (\text{ROA})(\text{EM}) \]
   \[ \text{ROE} = 0.097(1.80) = 0.1746, \text{ or } 17.46\% \]

   ROE can also be calculated as:

   \[ \text{ROE} = \frac{NI}{TE} \]

   So, net income is:
NI = ROE(TE)  
NI = (.1746)($735,000) = $128,331

3. This is a multi-step problem involving several ratios. The ratios given are all part of the DuPont Identity. The only DuPont Identity ratio not given is the profit margin. If we know the profit margin, we can find the net income since sales are given. So, we begin with the DuPont Identity:

ROE = 0.15 = (PM)(TAT)(EM) = (PM)(S / TA)(1 + D/E)

Solving the DuPont Identity for profit margin, we get:

PM = [(ROE)(TA)] / [(1 + D/E)(S)]
PM = [(0.15)($1,310)] / [(1 + 1.20)($2,700)] = .0331

Now that we have the profit margin, we can use this number and the given sales figure to solve for net income:

PM = .0331 = NI / S
NI = .0331($2,700) = $89.32

4. An increase of sales to $42,300 is an increase of:

Sales increase = ($42,300 – 37,300) / $37,300
Sales increase = .1340, or 13.40%

Assuming costs and assets increase proportionally, the pro forma financial statements will look like this:

<table>
<thead>
<tr>
<th>Pro forma income statement</th>
<th>Pro forma balance sheet</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sales $42,300.00</td>
<td>Assets $144,024.13</td>
</tr>
<tr>
<td>Costs 29,258.45</td>
<td>Debt $30,500.00</td>
</tr>
<tr>
<td>EBIT 13,041.55</td>
<td>Equity 102,272.31</td>
</tr>
<tr>
<td>Taxes (34%) 4,434.13</td>
<td>Total $144,024.13</td>
</tr>
<tr>
<td>Net income $8,607.43</td>
<td>Total $132,772.31</td>
</tr>
</tbody>
</table>

The payout ratio is constant, so the dividends paid this year is the payout ratio from last year times net income, or:
Dividends = ($2,500 / $7,590)($8,607.43)
Dividends = $2,835.12

The addition to retained earnings is:

Addition to retained earnings = $8,607.43 – 2,835.12
Addition to retained earnings = $5,772.31

And the new equity balance is:

Equity = $96,500 + 5,772.31
Equity = $102,272.31

So the EFN is:

EFN = Total assets – Total liabilities and equity
EFN = $144,024.13 – 132,772.31
EFN = $11,251.82
5. The maximum percentage sales increase without issuing new equity is the sustainable growth rate. To calculate the sustainable growth rate, we first need to calculate the ROE, which is:

\[
\text{ROE} = \frac{\text{NI}}{\text{TE}}
\]

\[
\text{ROE} = \frac{9,702}{81,000}
\]

\[
\text{ROE} = .1198
\]

The plowback ratio, \( b \), is one minus the payout ratio, so:

\[
b = 1 - .30
\]

\[
b = .70
\]

Now we can use the sustainable growth rate equation to get:

\[
\text{Sustainable growth rate} = \frac{\text{ROE} \times b}{1 - (\text{ROE} \times b)}
\]

\[
\text{Sustainable growth rate} = \frac{.1198(.70)}{1 - .1198(.70)}
\]

\[
\text{Sustainable growth rate} = .0915, \text{ or } 9.15\%
\]

So, the maximum dollar increase in sales is:

\[
\text{Maximum increase in sales} = 54,000(.0915)
\]

\[
\text{Maximum increase in sales} = 4,941.96
\]

6. We need to calculate the retention ratio to calculate the sustainable growth rate. The retention ratio is:

\[
b = 1 - .20
\]

\[
b = .80
\]

Now we can use the sustainable growth rate equation to get:

\[
\text{Sustainable growth rate} = \frac{\text{ROE} \times b}{1 - (\text{ROE} \times b)}
\]

\[
\text{Sustainable growth rate} = \frac{.13(.80)}{1 - .13(.80)}
\]

\[
\text{Sustainable growth rate} = .1161 \text{ or } 11.61\%
\]

7. We must first calculate the ROE using the DuPont ratio to calculate the sustainable growth rate. The ROE is:
ROE = (PM)(TAT)(EM)
ROE = (.074)(2.20)(1.40)
ROE = .2279 or 22.79%

The plowback ratio is one minus the dividend payout ratio, so:

\[ b = 1 - .40 \]
\[ b = .60 \]

Now, we can use the sustainable growth rate equation to get:

Sustainable growth rate = \( \frac{\text{ROE} \times b}{1 - \text{ROE} \times b} \)

Sustainable growth rate = \[ \frac{.2279(.60)}{1 - .2279(.60)} \]
Sustainable growth rate = .1584 or 15.84%

8. An increase of sales to $7,280 is an increase of:

Sales increase = \( \frac{$7,280 - 6,500}{6,500} \)
Sales increase = .12, or 12%

Assuming costs and assets increase proportionally, the pro forma financial statements will look like this:

<table>
<thead>
<tr>
<th>Pro forma income statement</th>
<th>Pro forma balance sheet</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sales $ 7,280</td>
<td>Assets $ 19,488</td>
</tr>
<tr>
<td>Costs 5,958</td>
<td>Debt $ 8,400</td>
</tr>
<tr>
<td>Net income $ 1,322</td>
<td>Equity 10,322</td>
</tr>
<tr>
<td>Total $ 19,488</td>
<td>Total $ 18,722</td>
</tr>
</tbody>
</table>

If no dividends are paid, the equity account will increase by the net income, so:

\[ \text{Equity} = $9,000 + 1,322 \]
\[ \text{Equity} = $10,322 \]

So the EFN is:

\[ \text{EFN} = \text{Total assets} – \text{Total liabilities and equity} \]
\[ \text{EFN} = $19,488 - 18,722 = $766 \]
9.  

a. First, we need to calculate the current sales and change in sales. The current sales are next year’s sales divided by one plus the growth rate, so:

\[
\text{Current sales} = \frac{\text{Next year’s sales}}{(1 + g)}
\]

\[
\text{Current sales} = \frac{420,000,000}{1 + .10}
\]

\[
\text{Current sales} = 381,818,182
\]

And the change in sales is:

\[
\text{Change in sales} = 420,000,000 - 381,818,182
\]

\[
\text{Change in sales} = 38,181,818
\]

We can now complete the current balance sheet. The current assets, fixed assets, and short-term debt are calculated as a percentage of current sales. The long-term debt and par value of stock are given. The plug variable is the additions to retained earnings. So:

<table>
<thead>
<tr>
<th>Assets</th>
<th>Liabilities and equity</th>
</tr>
</thead>
<tbody>
<tr>
<td>Current assets</td>
<td>$76,363,636</td>
</tr>
<tr>
<td></td>
<td></td>
</tr>
<tr>
<td>Fixed assets</td>
<td>286,363,636</td>
</tr>
<tr>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Total equity</td>
</tr>
<tr>
<td>Total assets</td>
<td>$362,727,273</td>
</tr>
</tbody>
</table>

b. We can use the equation from the text to answer this question. The assets/sales and debt/sales are the percentages given in the problem, so:

\[
\text{EFN} = \left( \frac{\text{Assets}}{\text{Sales}} \right) \times \Delta \text{Sales} - \left( \frac{\text{Debt}}{\text{Sales}} \right) \times \Delta \text{Sales} - (\text{PM} \times \text{Projected sales}) \times (1 - d)
\]

\[
\text{EFN} = (.20 + .75) \times 38,181,818 - (.15 \times 38,181,818) - [(.09 \times 420,000,000) \times (1 - .30)]
\]

\[
\text{EFN} = 4,085,455
\]
c. The current assets, fixed assets, and short-term debt will all increase at the same percentage as sales. The long-term debt and common stock will remain constant. The accumulated retained earnings will increase by the addition to retained earnings for the year. We can calculate the addition to retained earnings for the year as:

\[
\text{Net income} = \text{Profit margin} \times \text{Sales} \\
\text{Net income} = .09(420,000,000) \\
\text{Net income} = 37,800,000
\]

The addition to retained earnings for the year will be the net income times one minus the dividend payout ratio, which is:

\[
\text{Addition to retained earnings} = \text{Net income}(1 - d) \\
\text{Addition to retained earnings} = 37,800,000(1 - .30) \\
\text{Addition to retained earnings} = 26,460,000
\]

So, the new accumulated retained earnings will be:

\[
\text{Accumulated retained earnings} = 137,454,545 + 26,460,000 \\
\text{Accumulated retained earnings} = 163,914,545
\]

The pro forma balance sheet will be:

<table>
<thead>
<tr>
<th>Assets</th>
<th>Liabilities and equity</th>
</tr>
</thead>
<tbody>
<tr>
<td>Current assets $84,000,000</td>
<td>Short-term debt $63,000,000</td>
</tr>
<tr>
<td>Fixed assets $315,000,000</td>
<td>Long-term debt $120,000,000</td>
</tr>
<tr>
<td></td>
<td>Common stock $48,000,000</td>
</tr>
<tr>
<td></td>
<td>Accumulated retained earnings $163,914,545</td>
</tr>
<tr>
<td></td>
<td>Total equity $211,914,545</td>
</tr>
<tr>
<td>Total assets $399,000,000</td>
<td>Total liabilities and equity $394,914,545</td>
</tr>
</tbody>
</table>

The EFN is:

\[
\text{EFN} = \text{Total assets} - \text{Total liabilities and equity} \\
\text{EFN} = 399,000,000 - 394,914,545 \\
\text{EFN} = 4,085,455
\]
10.  

a. The sustainable growth is:

\[
\text{Sustainable growth rate} = \frac{\text{ROE} \times b}{1 - \text{ROE} \times b}
\]

where:

\[b = \text{Retention ratio} = 1 - \text{Payout ratio} = .60\]

So:

\[
\text{Sustainable growth rate} = \frac{.131 \times .60}{1 - .131 \times .60}
\]

Sustainable growth rate = .0853, or 8.53%

b. It is possible for the sustainable growth rate and the actual growth rate to differ. If any of the actual parameters in the sustainable growth rate equation differs from those used to compute the sustainable growth rate, the actual growth rate will differ from the sustainable growth rate. Since the sustainable growth rate includes ROE in the calculation, this also implies that changes in the profit margin, total asset turnover, or equity multiplier will affect the sustainable growth rate.

c. The company can increase its growth rate by doing any of the following:

- Increase the debt-to-equity ratio by selling more debt or repurchasing stock.
- Increase the profit margin, most likely by better controlling costs.
- Decrease its total assets/sales ratio; in other words, utilize its assets more efficiently.
- Reduce the dividend payout ratio.

Intermediate

11. The solution requires substituting two ratios into a third ratio. Rearranging D/TA:

| Firm A | Firm B |
D / TA = .35  
(TA – E) / TA = .35  
(TA / TA) – (E / TA) = .35  
1 – (E / TA) = .35  
E / TA = .65  
E = .65(TA)

Rearranging ROA, we find:

NI / TA = .09  
NI = .09(TA)

Since ROE = NI / E, we can substitute the above equations into the ROE formula, which yields:

ROE = .09(TA) / .65(TA) = .09/.65 = 13.85%  
ROE = .07(TA) / .45 (TA) = .07/.45 = 15.56%

12. PM = NI / S = –£37,543 / £345,182 = –.1088 or 10.88%

As long as both net income and sales are measured in the same currency, there is no problem; in fact, except for some market value ratios like EPS and BVPS, none of the financial ratios discussed in the text are measured in terms of currency. This is one reason why financial ratio analysis is widely used in international finance to compare the business operations of firms and/or divisions across national economic borders. The net income in dollars is:

NI = PM × Sales  
NI = –0.1088($559,725) = –$60,877.32

13. a. The equation for external funds needed is:

\[
\text{EFN} = \left( \frac{\text{Assets}}{\text{Sales}} \right) \times \Delta \text{Sales} - \left( \frac{\text{Debt}}{\text{Sales}} \right) \times \Delta \text{Sales} - (\text{PM} \times \text{Projected sales}) \times (1 - d)
\]

where:
Assets/Sales = $24,800,000/$30,400,000 = 0.82

\[ \Delta \text{Sales} = \text{Current sales} \times \text{Sales growth rate} = $30,400,000(0.15) = $4,560,000 \]

Debt/Sales = $6,400,000/$30,400,000 = 0.2105

PM = Net income/Sales = $2,392,000/$30,400,000 = 0.0787

Projected sales = Current sales \times (1 + \text{Sales growth rate}) = $30,400,000(1 + 0.15) = $34,960,000

\[ d = \frac{\text{Dividends}}{\text{Net income}} = \frac{956,800}{2,392,000} = 0.40 \]

so:

\[ \text{EFN} = (0.82 \times 4,560,000) - (0.2105 \times 4,560,000) - (0.0787 \times 34,960,000) \times (1 - 0.40) \]
\[ \text{EFN} = 1,109,520 \]

b. The current assets, fixed assets, and short-term debt will all increase at the same percentage as sales. The long-term debt and common stock will remain constant. The accumulated retained earnings will increase by the addition to retained earnings for the year. We can calculate the addition to retained earnings for the year as:

Net income = Profit margin \times Sales

Net income = 0.0787(34,960,000)

Net income = $2,750,800

The addition to retained earnings for the year will be the net income times one minus the dividend payout ratio, which is:

\[ \text{Addition to retained earnings} = \text{Net income}(1 - d) \]
\[ \text{Addition to retained earnings} = 2,750,800(1 - 0.40) \]
\[ \text{Addition to retained earnings} = 1,650,480 \]

So, the new accumulated retained earnings will be:

\[ \text{Accumulated retained earnings} = 10,400,000 + 1,650,480 \]
\[ \text{Accumulated retained earnings} = 12,050,480 \]

The pro forma balance sheet will be:

<table>
<thead>
<tr>
<th>Assets</th>
<th>Liabilities and equity</th>
</tr>
</thead>
<tbody>
<tr>
<td>Current assets</td>
<td>$8,280,000</td>
</tr>
<tr>
<td>Short-term debt</td>
<td>$7,360,000</td>
</tr>
</tbody>
</table>
The EFN is:

\[ EFN = Total\ assets - Total\ liabilities\ and\ equity \]
\[ EFN = $28,520,000 - 27,410,800 \]
\[ EFN = $1,109,520 \]

c. The sustainable growth is:

Sustainable growth rate = \( \frac{ROE \times b}{1 - ROE \times b} \)

where:

\[ ROE = \text{Net income/Total equity} = \frac{2,392,000}{13,600,000} = .1759 \]
\[ b = \text{Retention ratio} = \frac{Retained\ earnings/Net\ income}{1} = \frac{1,435,200}{2,392,000} = .60 \]

So:

Sustainable growth rate = \( \frac{.1759 \times .60}{1 - .1759 \times .60} \)

Sustainable growth rate = .1180 or 11.80%

d. The company cannot just cut its dividends to achieve the forecast growth rate. As shown below, even with a zero dividend policy, the EFN will still be $9,200.
The EFN is:

\[ \text{EFN} = \text{Total assets} - \text{Total liabilities and equity} \]
\[ \text{EFN} = 28,520,000 - 28,510,800 \]
\[ \text{EFN} = 9,200 \]

The company does have several alternatives. It can increase its asset utilization and/or its profit margin. The company could also increase the debt in its capital structure. This will decrease the equity account, thereby increasing ROE.

14. This is a multi-step problem involving several ratios. It is often easier to look backward to determine where to start. We need receivables turnover to find days’ sales in receivables. To calculate receivables turnover, we need credit sales, and to find credit sales, we need total sales. Since we are given the profit margin and net income, we can use these to calculate total sales as:

\[ \text{PM} = 0.093 = \frac{\text{NI}}{\text{Sales}} = \frac{265,000}{\text{Sales}}; \text{Sales} = 2,849,462 \]

Credit sales are 80 percent of total sales, so:

\[ \text{Credit sales} = 2,849,462(0.80) = 2,279,570 \]

Now we can find receivables turnover by:

\[ \text{Receivables turnover} = \frac{\text{Credit sales}}{\text{Accounts receivable}} = \frac{2,279,570}{145,300} = 15.69 \text{ times} \]

\[ \text{Days’ sales in receivables} = \frac{365}{15.69} = 23.27 \text{ days} \]

15. The solution to this problem requires a number of steps. First, remember that \( \text{CA} + \text{NFA} = \text{TA} \). So, if we find the CA and the TA, we can solve for NFA. Using the numbers given for the current ratio and the current liabilities, we solve for CA:

\[ \text{CR} = \frac{\text{CA}}{\text{CL}} \]
CA = CR(CL) = 1.25($950) = $1,187.50

To find the total assets, we must first find the total debt and equity from the information given. So, we find the net income using the profit margin:

\[
PM = \frac{NI}{Sales}
\]
\[
NI = Profit\ margin \times Sales = .094($5,780) = $543.32
\]

We now use the net income figure as an input into ROE to find the total equity:

\[
ROE = \frac{NI}{TE}
\]
\[
TE = \frac{NI}{ROE} = \frac{$543.32}{.182} = $2,985.27
\]

Next, we need to find the long-term debt. The long-term debt ratio is:

\[
Long-term\ debt\ ratio = 0.35 = \frac{LTD}{LTD + TE}
\]

Inverting both sides gives:

\[
1 / 0.35 = \frac{(LTD + TE)}{LTD} = 1 + \frac{TE}{LTD}
\]

Substituting the total equity into the equation and solving for long-term debt gives the following:

\[
1 + $2,985.27 / LTD = 2.86
\]
\[
LTD = \frac{$2,985.27}{1.86} = $1,607.46
\]

Now, we can find the total debt of the company:

\[
TD = CL + LTD = $950 + 1,607.46 = $2,557.46
\]

And, with the total debt, we can find the TD&E, which is equal to TA:

\[
TA = TD + TE = $2,557.46 + 2,985.27 = $5,542.73
\]

And finally, we are ready to solve the balance sheet identity as:

\[
NFA = TA – CA = $5,542.73 – 1,187.50 = $4,355.23
\]
16. This problem requires you to work backward through the income statement. First, recognize that \[ \text{Net income} = (1 - t_c) \text{EBT} \]. Plugging in the numbers given and solving for EBT, we get:

\[ \text{EBT} = \frac{8,320}{(1 - 0.34)} = 12,606.06 \]

Now, we can add interest to EBT to get EBIT as follows:

\[ \text{EBIT} = \text{EBT} + \text{Interest paid} = 12,606.06 + 1,940 = 14,546.06 \]

To get EBITD (earnings before interest, taxes, and depreciation), the numerator in the cash coverage ratio, add depreciation to EBIT:

\[ \text{EBITD} = \text{EBIT} + \text{Depreciation} = 14,546.06 + 2,730 = 17,276.06 \]

Now, simply plug the numbers into the cash coverage ratio and calculate:

\[ \text{Cash coverage ratio} = \frac{\text{EBITD}}{\text{Interest}} = \frac{17,276.06}{1,940} = 8.91 \text{ times} \]

17. We can start by multiplying ROE by \( \frac{\text{Total assets}}{\text{Total assets}} \)

\[ \frac{\text{Net income}}{\text{Equity}} = \frac{\text{Net income}}{\text{Equity}} \times \frac{\text{Total assets}}{\text{Total assets}} \]

Rearranging, we get:

\[ \frac{\text{Net income}}{\text{Total assets}} \times \frac{\text{Total assets}}{\text{Equity}} \]

Next, we can multiply by \( \frac{\text{Sales}}{\text{Sales}} \), which yields:

\[ \frac{\text{Net income}}{\text{Total assets}} \times \frac{\text{Equity}}{\text{Total assets}} \times \frac{\text{Sales}}{\text{Sales}} \]

Rearranging, we get:

\[ \frac{\text{Net income}}{\text{Sales}} \times \frac{\text{Sales}}{\text{Total assets}} \times \frac{\text{Total assets}}{\text{Equity}} \]
Next, we can multiply the preceding three factor DuPont equation by EBT / EBT, which yields:

\[
\text{ROE} = \frac{\text{Net income}}{\text{Sales}} \times \frac{\text{EBT}}{\text{Total assets}} \times \frac{\text{Sales}}{\text{Total assets}} \times \frac{\text{EBT}}{\text{Equity}}
\]

We can rearrange as:

\[
\text{ROE} = \frac{\text{Net income}}{\text{EBT}} \times \frac{\text{EBT}}{\text{Sales}} \times \frac{\text{Sales}}{\text{Total assets}} \times \frac{\text{Total assets}}{\text{Equity}}
\]

Finally, multiplying this equation EBIT / EBIT and rearranging yields:

\[
\text{ROE} = \frac{\text{Net income}}{\text{EBT}} \times \frac{\text{EBT}}{\text{Sales}} \times \frac{\text{EBT}}{\text{Total assets}} \times \frac{\text{Sales}}{\text{Equity} \times \text{EBIT}}
\]

The interpretation of each term is as follows:

1. This is the company’s tax burden. This is the proportion of the company's profits retained after paying income taxes.
2. This is the company’s interest burden. It will be 1.00 for a company with no debt or financial leverage.
3. This is the company’s operating profit margin. It is the operating profit before interest and taxes per dollar of sales.
4. This is the company’s operating efficiency as measured by dollar of sales per dollar of total assets.
5. This is the company’s financial leverage as measured by the equity multiplier.

<table>
<thead>
<tr>
<th>Asset</th>
<th>2011 size</th>
<th>2012 size</th>
<th>base year</th>
</tr>
</thead>
<tbody>
<tr>
<td>Current assets</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Cash</td>
<td>$8,014</td>
<td>$9,954</td>
<td>1.2421</td>
</tr>
</tbody>
</table>
### Solutions Manual

<table>
<thead>
<tr>
<th>Accounts receivable</th>
<th>20,453</th>
<th>7.29%</th>
<th>22,937</th>
<th>7.21%</th>
<th>1.1214</th>
</tr>
</thead>
<tbody>
<tr>
<td>Inventory</td>
<td>36,822</td>
<td>13.12%</td>
<td>41,797</td>
<td>13.14%</td>
<td>1.1351</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td>$65,289</td>
<td>23.26%</td>
<td>$74,688</td>
<td>23.48%</td>
<td>1.1440</td>
</tr>
<tr>
<td>Fixed assets</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Net plant and equipment</td>
<td>215,370</td>
<td>76.74%</td>
<td>243,340</td>
<td>76.52%</td>
<td>1.1299</td>
</tr>
<tr>
<td><strong>Total assets</strong></td>
<td>$280,659</td>
<td>100%</td>
<td>$318,028</td>
<td>100%</td>
<td>1.1331</td>
</tr>
</tbody>
</table>

### Liabilities and Owners’ Equity

<table>
<thead>
<tr>
<th>Current liabilities</th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Accounts payable</td>
<td>$40,898</td>
<td>14.57%</td>
<td>$45,884</td>
<td>14.43%</td>
<td>1.1219</td>
</tr>
<tr>
<td>Notes payable</td>
<td>17,464</td>
<td>6.22%</td>
<td>17,035</td>
<td>5.36%</td>
<td>0.9754</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td>$58,362</td>
<td>20.79%</td>
<td>$62,919</td>
<td>19.78%</td>
<td>1.0781</td>
</tr>
<tr>
<td>Long-term debt</td>
<td>24,000</td>
<td>8.55%</td>
<td>31,000</td>
<td>9.75%</td>
<td>1.2917</td>
</tr>
<tr>
<td>Owners’ equity</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Common stock and paid-in surplus</td>
<td>$38,000</td>
<td>13.54%</td>
<td>$39,200</td>
<td>12.33%</td>
<td>1.0316</td>
</tr>
<tr>
<td>Accumulated retained earnings</td>
<td>160,297</td>
<td>57.11%</td>
<td>184,909</td>
<td>58.14%</td>
<td>1.1535</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td>$198,297</td>
<td>70.65%</td>
<td>$224,109</td>
<td>70.47%</td>
<td>1.1302</td>
</tr>
</tbody>
</table>

| Total liabilities and owners' equity | $280,659 |        | $318,028 | 100% | 1.1331 |

The common-size balance sheet answers are found by dividing each category by total assets. For example, the cash percentage for 2011 is:

\[
\frac{\$8,014}{\$280,659} = .0286 \text{ or } 2.86\%
\]

This means that cash is 2.86% of total assets.

The common-base year answers for Question 18 are found by dividing each category value for 2012 by the same category value for 2011. For example, the cash common-base year number is found by:

\[
\frac{\$9,954}{\$8,014} = 1.2421
\]

This means the cash balance in 2012 is 1.2421 times as large as the cash balance in 2011.
19. To determine full capacity sales, we divide the current sales by the capacity the company is currently using, so:

\[
\text{Full capacity sales} = \frac{725,000}{0.90} \\
\text{Full capacity sales} = 805,556
\]

So, the dollar growth rate in sales is:

\[
\text{Sales growth} = 805,556 - 725,000 \\
\text{Sales growth} = 80,556
\]

20. To find the new level of fixed assets, we need to find the current percentage of fixed assets to full capacity sales. Doing so, we find:

\[
\frac{\text{Fixed assets}}{\text{Full capacity sales}} = \frac{690,000}{805,556} \\
\frac{\text{Fixed assets}}{\text{Full capacity sales}} = 0.8566
\]

Next, we calculate the total dollar amount of fixed assets needed at the new sales figure.

\[
\text{Total fixed assets} = 0.8566(830,000) \\
\text{Total fixed assets} = 710,938
\]

The new fixed assets necessary is the total fixed assets at the new sales figure minus the current level of fixed assets.

\[
\text{New fixed assets} = 710,938 - 690,000 \\
\text{New fixed assets} = 20,938
\]

21. Assuming costs vary with sales and a 20 percent increase in sales, the pro forma income statement will look like this:

MOOSE TOURS INC.
Pro Forma Income Statement

<p>| | |</p>
<table>
<thead>
<tr>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Sales</td>
<td>$1,003,320</td>
</tr>
<tr>
<td>Costs</td>
<td>780,840</td>
</tr>
<tr>
<td>Other expenses</td>
<td>20,520</td>
</tr>
</tbody>
</table>
EBIT $201,960
Interest 12,600
Taxable income $189,360
Taxes(35%) 66,276
Net income $123,084

The payout ratio is constant, so the dividends paid this year is the payout ratio from last year times net income, or:

Dividends = ($30,300/$101,205)($123,084)
Dividends = $36,850

And the addition to retained earnings will be:

Addition to retained earnings = $123,084 – 36,850
Addition to retained earnings = $86,234

The new retained earnings on the pro forma balance sheet will be:

New retained earnings = $176,855 + 86,234
New retained earnings = $263,089

The pro forma balance sheet will look like this:

MOOSE TOURS INC.
Pro Forma Balance Sheet

<table>
<thead>
<tr>
<th>Assets</th>
<th>Liabilities and Owners’ Equity</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Current assets</strong></td>
<td></td>
</tr>
<tr>
<td>Cash</td>
<td>$28,842</td>
</tr>
<tr>
<td>Accounts receivable</td>
<td>46,398</td>
</tr>
<tr>
<td>Inventory</td>
<td>99,066</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td>$174,306</td>
</tr>
<tr>
<td><strong>Fixed assets</strong></td>
<td></td>
</tr>
<tr>
<td>Net plant and equipment</td>
<td>470,820</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td></td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>$645,126</strong></td>
</tr>
<tr>
<td><strong>Current liabilities</strong></td>
<td></td>
</tr>
<tr>
<td>Accounts payable</td>
<td>$77,520</td>
</tr>
<tr>
<td>Notes payable</td>
<td>16,150</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td>$93,670</td>
</tr>
<tr>
<td><strong>Long-term debt</strong></td>
<td><strong>$150,000</strong></td>
</tr>
</tbody>
</table>

Owners’ equity
Common stock and paid-in surplus $130,000
Solutions Manual

<table>
<thead>
<tr>
<th>Retained earnings</th>
<th>$263,089</th>
</tr>
</thead>
<tbody>
<tr>
<td>Total</td>
<td>$393,089</td>
</tr>
<tr>
<td>Total liabilities and owners’ equity</td>
<td>$636,759</td>
</tr>
</tbody>
</table>

Total assets $645,126

So the EFN is:

\[
\text{EFN} = \text{Total assets} - \text{Total liabilities and equity} \\
\text{EFN} = $645,126 - 636,759 \\
\text{EFN} = $8,367
\]

22. First, we need to calculate full capacity sales, which is:

Full capacity sales = $836,100 / .80
Full capacity sales = $1,045,125

The full capacity ratio at full capacity sales is:

\[
\text{Full capacity ratio} = \frac{\text{Fixed assets}}{\text{Full capacity sales}} \\
\text{Full capacity ratio} = \frac{392,350}{1,045,125} \\
\text{Full capacity ratio} = .37541
\]

The fixed assets required at full capacity sales is the full capacity ratio times the projected sales level:

Total fixed assets = .37541($1,003,320) = $376,656

So, EFN is:

\[
\text{EFN} = (174,306 + 376,656) - 636,759 = -85,797
\]

Note that this solution assumes that fixed assets are decreased (sold) so the company has a 100 percent fixed asset utilization. If we assume fixed assets are not sold, the answer becomes:

\[
\text{EFN} = (174,306 + 392,350) - 636,759 = -70,103
\]
23. The D/E ratio of the company is:

\[
\text{D/E} = \frac{($80,750 + 150,000)}{306,855} \\
\text{D/E} = 0.75198
\]

So the new total debt amount will be:

\[
\text{New total debt} = 0.75198(393,089) \\
\text{New total debt} = 295,596
\]

This is the new total debt for the company. Given that our calculation for EFN is the amount that must be raised externally and does not increase spontaneously with sales, we need to subtract the spontaneous increase in accounts payable. The new level of accounts payable will be the current accounts payable times the sales growth, or:

\[
\text{Spontaneous increase in accounts payable} = 64,600(0.20) \\
\text{Spontaneous increase in accounts payable} = 12,920
\]

This means that $12,920 of the new total debt is not raised externally. So, the debt raised externally, which will be the EFN is:

\[
\text{EFN} = \text{New total debt} - (\text{Beginning LTD} + \text{Beginning CL} + \text{Spontaneous increase in AP}) \\
\text{EFN} = 295,596 - (150,000 + 80,750 + 12,920) = 51,926
\]
The pro forma balance sheet with the new long-term debt will be:

MOOSE TOURS INC.
Pro Forma Balance Sheet

<table>
<thead>
<tr>
<th>Assets</th>
<th>Liabilities and Owners’ Equity</th>
</tr>
</thead>
<tbody>
<tr>
<td>Current assets</td>
<td></td>
</tr>
<tr>
<td>Cash</td>
<td>$ 28,842</td>
</tr>
<tr>
<td>Accounts receivable</td>
<td>46,398</td>
</tr>
<tr>
<td>Inventory</td>
<td>99,066</td>
</tr>
<tr>
<td>Total</td>
<td>$ 174,306</td>
</tr>
<tr>
<td>Fixed assets</td>
<td></td>
</tr>
<tr>
<td>Net plant and equipment</td>
<td>$ 470,820</td>
</tr>
<tr>
<td>Owners’ equity</td>
<td></td>
</tr>
<tr>
<td>Common stock and paid-in surplus</td>
<td>$ 130,000</td>
</tr>
<tr>
<td>Retained earnings</td>
<td>263,089</td>
</tr>
<tr>
<td>Total</td>
<td>$ 393,089</td>
</tr>
<tr>
<td>Total assets</td>
<td>$ 645,126</td>
</tr>
<tr>
<td>Long-term debt</td>
<td>201,926</td>
</tr>
<tr>
<td>Total liabilities and owners’ equity</td>
<td>$ 688,685</td>
</tr>
</tbody>
</table>

The funds raised by the debt issue can be put into an excess cash account to make the balance sheet balance. The excess debt will be:

Excess debt = $688,685 – $645,126 = $43,559

To make the balance sheet balance, the company will have to increase its assets. We will put this amount in an account called excess cash, which will give us the following balance sheet:
# MOOSE TOURS INC.

## Pro Forma Balance Sheet

<table>
<thead>
<tr>
<th>Assets</th>
<th>Liabilities and Owners’ Equity</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Current assets</strong></td>
<td><strong>Current liabilities</strong></td>
</tr>
<tr>
<td>Cash</td>
<td>Accounts payable</td>
</tr>
<tr>
<td>$28,842</td>
<td>$77,520</td>
</tr>
<tr>
<td>Excess cash</td>
<td></td>
</tr>
<tr>
<td>43,559</td>
<td></td>
</tr>
<tr>
<td>Accounts receivable</td>
<td>Notes payable</td>
</tr>
<tr>
<td>46,398</td>
<td>16,150</td>
</tr>
<tr>
<td>Inventory</td>
<td>Total</td>
</tr>
<tr>
<td>99,066</td>
<td>$93,670</td>
</tr>
<tr>
<td>Total</td>
<td>Long-term debt</td>
</tr>
<tr>
<td>$217,865</td>
<td>$201,926</td>
</tr>
<tr>
<td><strong>Fixed assets</strong></td>
<td><strong>Owners’ equity</strong></td>
</tr>
<tr>
<td>Net plant and equipment</td>
<td>Common stock and paid-in surplus</td>
</tr>
<tr>
<td>470,820</td>
<td>$130,000</td>
</tr>
<tr>
<td></td>
<td>Retained earnings</td>
</tr>
<tr>
<td></td>
<td>263,089</td>
</tr>
<tr>
<td></td>
<td>Total</td>
</tr>
<tr>
<td></td>
<td>$393,089</td>
</tr>
<tr>
<td><strong>Total assets</strong></td>
<td>Total liabilities and owners’ equity</td>
</tr>
<tr>
<td>$688,685</td>
<td>$688,685</td>
</tr>
</tbody>
</table>

The excess cash has an opportunity cost that we discussed earlier. Increasing fixed assets would also not be a good idea since the company already has enough fixed assets. A likely scenario would be the repurchase of debt and equity in its current capital structure weights.

The company’s debt-assets and equity-assets are:

Debt-assets = .75198 / (1 + .75198) = .43

Equity-assets = 1 / (1 + .75198) = .57

So, the amount of debt and equity needed will be:

Total debt needed = .43($645,126) = $276,900

Equity needed = .57($645,126) = $368,226

So, the repurchases of debt and equity will be:

Debt repurchase = ($93,670 + 201,926) – 276,900 = $18,696

Equity repurchase = $393,089 – 368,226 = $24,863
Assuming all of the debt repurchase is from long-term debt, and the equity repurchase is entirely from the retained earnings, the final pro forma balance sheet will be:
MOOSE TOURS INC.  
Pro Forma Balance Sheet

<table>
<thead>
<tr>
<th>Assets</th>
<th>Liabilities and Owners’ Equity</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Current assets</strong></td>
<td></td>
</tr>
<tr>
<td>Cash</td>
<td>$28,842</td>
</tr>
<tr>
<td>Accounts receivable</td>
<td>46,398</td>
</tr>
<tr>
<td>Inventory</td>
<td>99,066</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td>$174,306</td>
</tr>
<tr>
<td><strong>Fixed assets</strong></td>
<td></td>
</tr>
<tr>
<td>Net plant and equipment</td>
<td>$470,820</td>
</tr>
<tr>
<td><strong>Total assets</strong></td>
<td>$645,126</td>
</tr>
<tr>
<td><strong>Current liabilities</strong></td>
<td></td>
</tr>
<tr>
<td>Accounts payable</td>
<td>$77,520</td>
</tr>
<tr>
<td>Notes payable</td>
<td>16,150</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td>$93,670</td>
</tr>
<tr>
<td><strong>Long-term debt</strong></td>
<td>$183,230</td>
</tr>
<tr>
<td><strong>Total liabilities and owners’ equity</strong></td>
<td>$645,126</td>
</tr>
<tr>
<td>Common stock and paid-in surplus</td>
<td>$130,000</td>
</tr>
<tr>
<td>Retained earnings</td>
<td>238,226</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td>$368,226</td>
</tr>
</tbody>
</table>

**Challenge**

24. The pro forma income statements for all three growth rates will be:

MOOSE TOURS INC.  
Pro Forma Income Statement

<table>
<thead>
<tr>
<th></th>
<th>15% Sales Growth</th>
<th>20% Sales Growth</th>
<th>25% Sales Growth</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sales</td>
<td>$961,515</td>
<td>$1,003,320</td>
<td>$1,045,125</td>
</tr>
<tr>
<td>Costs</td>
<td>748,305</td>
<td>780,840</td>
<td>813,375</td>
</tr>
<tr>
<td>Other expenses</td>
<td>19,665</td>
<td>20,520</td>
<td>21,375</td>
</tr>
<tr>
<td><strong>EBIT</strong></td>
<td>$193,545</td>
<td>$201,960</td>
<td>$210,375</td>
</tr>
<tr>
<td><strong>Interest</strong></td>
<td>12,600</td>
<td>12,600</td>
<td>12,600</td>
</tr>
<tr>
<td><strong>Taxable income</strong></td>
<td>$180,945</td>
<td>$189,360</td>
<td>$197,775</td>
</tr>
<tr>
<td><strong>Taxes (35%)</strong></td>
<td>63,331</td>
<td>66,276</td>
<td>69,221</td>
</tr>
<tr>
<td><strong>Net income</strong></td>
<td>$117,614</td>
<td>$123,084</td>
<td>$128,554</td>
</tr>
<tr>
<td><strong>Dividends</strong></td>
<td>$35,213</td>
<td>$36,850</td>
<td>$38,488</td>
</tr>
</tbody>
</table>
We will calculate the EFN for the 15 percent growth rate first. Assuming the payout ratio is constant, the dividends paid will be:

\[
\text{Dividends} = \left( \frac{30,300}{936,100} \right) (117,614) = 35,213
\]

And the addition to retained earnings will be:

\[
\text{Addition to retained earnings} = 117,614 - 35,213 = 82,401
\]

The new retained earnings on the pro forma balance sheet will be:

\[
\text{New retained earnings} = 176,855 + 82,401 = 259,256
\]

The pro forma balance sheet will look like this:

\[
\begin{array}{cccc}
\text{15\% Sales Growth} & \\
\hline
\text{MOOSE TOURS INC.} & \\
\text{Pro Forma Balance Sheet} & \\
\hline
\text{Assets} & \text{Liabilities and Owners’ Equity} & \\
\hline
\text{Current assets} & \text{Current liabilities} & \\
\text{Cash} & $27,640 & \text{Accounts payable} & $74,290 \\
\text{Accounts receivable} & 44,465 & \text{Notes payable} & 16,150 \\
\text{Inventory} & 94,938 & \text{Total} & 90,440 \\
\text{Total} & $167,043 & \text{Long-term debt} & $150,000 \\
\hline
\text{Fixed assets} & \text{Owners’ equity} & \\
\text{Net plant and equipment} & 451,203 & \text{Common stock and paid-in surplus} & $130,000 \\
\text{Retained earnings} & 259,256 & \text{Total} & $389,256 \\
\text{Total} & $389,256 & \text{Total liabilities and owners’} & \\
\end{array}
\]
Solutions Manual

Total assets $ 618,246
equity $ 629,696

So the EFN is:

EFN = Total assets – Total liabilities and equity
EFN = $618,246 – 629,696
EFN = –$11,451

At a 20 percent growth rate, and assuming the payout ratio is constant, the dividends paid will be:

Dividends = ($30,300/$101,205)($123,084)
Dividends = $36,850

And the addition to retained earnings will be:

Addition to retained earnings = $123,084 – 36,850
Addition to retained earnings = $86,234

The new retained earnings on the pro forma balance sheet will be:

New retained earnings = $176,855 + 86,234
New retained earnings = $263,089

The pro forma balance sheet will look like this:

20% Sales Growth:

MOOSE TOURS INC.
Pro Forma Balance Sheet

<table>
<thead>
<tr>
<th>Assets</th>
<th>Liabilities and Owners’ Equity</th>
</tr>
</thead>
<tbody>
<tr>
<td>Current assets</td>
<td></td>
</tr>
<tr>
<td>Cash</td>
<td>$28,842</td>
</tr>
<tr>
<td>Accounts receivable</td>
<td>46,398</td>
</tr>
<tr>
<td>Inventory</td>
<td>99,066</td>
</tr>
<tr>
<td>Total</td>
<td>$174,306</td>
</tr>
<tr>
<td>Fixed assets</td>
<td></td>
</tr>
<tr>
<td>Current liabilities</td>
<td></td>
</tr>
<tr>
<td>Accounts payable</td>
<td>$77,520</td>
</tr>
<tr>
<td>Notes payable</td>
<td>16,150</td>
</tr>
<tr>
<td>Total</td>
<td>$93,670</td>
</tr>
<tr>
<td>Long-term debt</td>
<td>150,000</td>
</tr>
</tbody>
</table>
Solutions Manual

<table>
<thead>
<tr>
<th>Net plant and equipment</th>
<th>Owners’ equity</th>
</tr>
</thead>
<tbody>
<tr>
<td>470,820</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Common stock and paid-in surplus</th>
<th>Retained earnings</th>
</tr>
</thead>
<tbody>
<tr>
<td>$ 130,000</td>
<td>263,089</td>
</tr>
<tr>
<td></td>
<td></td>
</tr>
<tr>
<td>Total</td>
<td></td>
</tr>
<tr>
<td>$ 393,089</td>
<td></td>
</tr>
</tbody>
</table>

Total liabilities and owners’ equity

<table>
<thead>
<tr>
<th>Total assets</th>
<th>$ 645,126</th>
</tr>
</thead>
</table>

So the EFN is:

EFN = Total assets – Total liabilities and equity
EFN = $645,126 – 636,759
EFN = $8,367

At a 25 percent growth rate, and assuming the payout ratio is constant, the dividends paid will be:

Dividends = ($30,300/$101,205)($128,554)
Dividends = $38,488

And the addition to retained earnings will be:

Addition to retained earnings = $128,554 – 38,488
Addition to retained earnings = $90,066

The new retained earnings on the pro forma balance sheet will be:

New retained earnings = $176,855 + 90,066
New retained earnings = $266,921

The pro forma balance sheet will look like this:
25% Sales Growth:

MOOSE TOURS INC.

Pro Forma Balance Sheet

<table>
<thead>
<tr>
<th>Assets</th>
<th>Liabilities and Owners’ Equity</th>
</tr>
</thead>
<tbody>
<tr>
<td>Current assets</td>
<td></td>
</tr>
<tr>
<td>Cash</td>
<td>$ 30,044</td>
</tr>
<tr>
<td>Accounts receivable</td>
<td>48,331</td>
</tr>
<tr>
<td>Inventory</td>
<td>103,194</td>
</tr>
<tr>
<td>Total</td>
<td>$ 181,569</td>
</tr>
<tr>
<td>Fixed assets</td>
<td></td>
</tr>
<tr>
<td>Net plant and equipment</td>
<td>490,438</td>
</tr>
<tr>
<td>Owners’ equity</td>
<td></td>
</tr>
<tr>
<td>Common stock and paid-in surplus</td>
<td>$ 130,000</td>
</tr>
<tr>
<td>Retained earnings</td>
<td>$ 266,921</td>
</tr>
<tr>
<td>Total liabilities and owners’ equity</td>
<td>$ 396,921</td>
</tr>
<tr>
<td>Total assets</td>
<td>$ 672,006</td>
</tr>
</tbody>
</table>

So the EFN is:

\[
\text{EFN} = \text{Total assets} - \text{Total liabilities and equity}
\]

\[
\text{EFN} = $672,006 - 643,821
\]

\[
\text{EFN} = $28,186
\]

25. The pro forma income statements for all three growth rates will be:

MOOSE TOURS INC.

Pro Forma Income Statement

<table>
<thead>
<tr>
<th></th>
<th>20% Sales Growth</th>
<th>30% Sales Growth</th>
<th>35% Sales Growth</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sales</td>
<td>$1,003,320</td>
<td>$1,086,930</td>
<td>$1,128,735</td>
</tr>
<tr>
<td>Costs</td>
<td>780,840</td>
<td>845,910</td>
<td>878,445</td>
</tr>
<tr>
<td>Other expenses</td>
<td>20,520</td>
<td>22,230</td>
<td>23,085</td>
</tr>
<tr>
<td>EBIT</td>
<td>$201,960</td>
<td>$218,790</td>
<td>$227,205</td>
</tr>
<tr>
<td>Interest</td>
<td>12,600</td>
<td>12,600</td>
<td>12,600</td>
</tr>
<tr>
<td>Taxable income</td>
<td>$189,360</td>
<td>$206,190</td>
<td>$214,605</td>
</tr>
</tbody>
</table>
At a 30 percent growth rate, and assuming the payout ratio is constant, the dividends paid will be:

\[
\text{Dividends} = \left(\frac{30,300}{101,205}\right)(134,024)
\]

\[
\text{Dividends} = 40,126
\]
Solutions Manual

And the addition to retained earnings will be:

Addition to retained earnings = $134,024 – 40,126
Addition to retained earnings = $93,898

The new addition to retained earnings on the pro forma balance sheet will be:

New addition to retained earnings = $176,855 + 93,898
New addition to retained earnings = $270,753

The new total debt will be:

New total debt = .75198($400,753)
New total debt = $301,260

So, the new long-term debt will be the new total debt minus the new short-term debt, or:

New long-term debt = $301,260 – 100,130
New long-term debt = $201,230

The pro forma balance sheet will look like this:

Sales growth rate = 30% and debt/equity ratio = .75198:

MOOSE TOURS INC.

Pro Forma Balance Sheet

<table>
<thead>
<tr>
<th>Assets</th>
<th>Liabilities and Owners’ Equity</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Current assets</td>
</tr>
<tr>
<td></td>
<td>Cash</td>
</tr>
<tr>
<td></td>
<td>Accounts receivable</td>
</tr>
<tr>
<td></td>
<td>Inventory</td>
</tr>
<tr>
<td></td>
<td>Total</td>
</tr>
<tr>
<td>Fixed assets</td>
<td>Net plant and equipment</td>
</tr>
<tr>
<td></td>
<td></td>
</tr>
<tr>
<td>Total liabilities and owners’ equity</td>
<td>$ 702,133</td>
</tr>
<tr>
<td>------------------------------------------</td>
<td>----------</td>
</tr>
<tr>
<td>Retained earnings</td>
<td>270,753</td>
</tr>
<tr>
<td>Total</td>
<td>$ 400,753</td>
</tr>
<tr>
<td>Total assets</td>
<td>$ 698,887</td>
</tr>
</tbody>
</table>

So the excess debt raised is:

Excess debt = $702,133 – 698,887
Excess debt = $3,226
At a 35 percent growth rate, and assuming the payout ratio is constant, the dividends paid will be:

\[
\text{Dividends} = \left(\frac{30,300}{101,205}\right)(139,493)
\]
\[
\text{Dividends} = 41,763
\]

And the addition to retained earnings will be:

\[
\text{Addition to retained earnings} = 139,493 - 41,763
\]
\[
\text{Addition to retained earnings} = 97,730
\]

The new retained earnings on the pro forma balance sheet will be:

\[
\text{New retained earnings} = 176,855 + 97,730
\]
\[
\text{New retained earnings} = 274,585
\]

The new total debt will be:

\[
\text{New total debt} = 0.75198(404,585)
\]
\[
\text{New total debt} = 304,241
\]

So, the new long-term debt will be the new total debt minus the new short-term debt, or:

\[
\text{New long-term debt} = 304,241 - 103,360
\]
\[
\text{New long-term debt} = 200,881
\]

*Sales growth rate = 35% and debt/equity ratio = 0.75198:*

<table>
<thead>
<tr>
<th>MOOSE TOURS INC.</th>
<th>Pro Forma Balance Sheet</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Assets</strong></td>
<td><strong>Liabilities and Owners’ Equity</strong></td>
</tr>
<tr>
<td>Current assets</td>
<td>Current liabilities</td>
</tr>
<tr>
<td>Cash</td>
<td>$32,447</td>
</tr>
<tr>
<td>Accounts receivable</td>
<td>52,198</td>
</tr>
<tr>
<td>Inventory</td>
<td>111,449</td>
</tr>
<tr>
<td>Total</td>
<td>$196,094</td>
</tr>
</tbody>
</table>
Fixed assets

<table>
<thead>
<tr>
<th></th>
<th>Owners’ equity</th>
</tr>
</thead>
<tbody>
<tr>
<td>Net plant and</td>
<td></td>
</tr>
<tr>
<td>equipment</td>
<td>$ 529,673</td>
</tr>
<tr>
<td>Common stock and</td>
<td></td>
</tr>
<tr>
<td>paid-in surplus</td>
<td>$ 130,000</td>
</tr>
<tr>
<td>Retained earnings</td>
<td>$ 274,585</td>
</tr>
<tr>
<td>Total</td>
<td>$ 404,585</td>
</tr>
</tbody>
</table>

Total liabilities and owners’ equity

<table>
<thead>
<tr>
<th>Total assets</th>
<th>Total liabilities and owners’ equity</th>
</tr>
</thead>
<tbody>
<tr>
<td>$ 725,767</td>
<td>$ 708,826</td>
</tr>
</tbody>
</table>

So the excess debt raised is:

Excess debt = $708,826 – 725,767
Excess debt = –$16,940

At a 35 percent growth rate, the firm will need funds in the amount of $16,940 in addition to the external debt already raised. So, the EFN will be:

EFN = $50,881 + 16,940
EFN = $67,822

26. We need the ROE to calculate the sustainable growth rate. The ROE is:

\[ \text{ROE} = (\text{PM})(\text{TAT})(\text{EM}) \]
\[ \text{ROE} = (.053)(1 / 0.75)(1 + 0.40) \]
\[ \text{ROE} = .0989 \text{ or } 9.89\% \]

Now, we can use the sustainable growth rate equation to find the retention ratio as:

\[ \text{Sustainable growth rate} = (\text{ROE} \times b) / [1 - (\text{ROE} \times b)] \]
\[ \text{Sustainable growth rate} = .12 = [.0989b] / [1 – .0989b] \]
\[ b = 1.08 \]

This implies the payout ratio is:

\[ \text{Payout ratio} = 1 - b \]
\[ \text{Payout ratio} = 1 - 1.08 \]
\[ \text{Payout ratio} = -0.08 \]
This is a dividend payout ratio of negative 8 percent, which is impossible. The growth rate is not consistent with the other constraints. The lowest possible payout rate is 0, which corresponds to retention ratio of 1, or total earnings retention.

The maximum sustainable growth rate for this company is:

\[
\text{Maximum sustainable growth rate} = \frac{\text{ROE} \times b}{1 - (\text{ROE} \times b)}
\]

Maximum sustainable growth rate = \ [.0989(1)] / [1 – .0989(1)]

Maximum sustainable growth rate = .1098 or 10.98%

27. We know that EFN is:

\[
\text{EFN} = \text{Increase in assets} - \text{Addition to retained earnings}
\]

The increase in assets is the beginning assets times the growth rate, so:

Increase in assets = \( A \times g \)

The addition to retained earnings next year is the current net income times the retention ratio, times one plus the growth rate, so:

Addition to retained earnings = \( (NI \times b)(1 + g) \)

And rearranging the profit margin to solve for net income, we get:

\[
\text{NI} = \text{PM(S)}
\]

Substituting the last three equations into the EFN equation we started with and rearranging, we get:

\[
\text{EFN} = A(g) - \text{PM(S)}b(1 + g)
\]

\[
\text{EFN} = A(g) - \text{PM(S)}b - [\text{PM(S)}b]g
\]

\[
\text{EFN} = -\text{PM(S)}b + [A - \text{PM(S)}b]g
\]

28. We start with the EFN equation we derived in Problem 27 and set it equal to zero:

\[
\text{EFN} = 0 = -\text{PM(S)}b + [A - \text{PM(S)}b]g
\]
Substituting the rearranged profit margin equation into the internal growth rate equation, we have:

Internal growth rate = \[ \frac{[PM(S)b]}{[A – PM(S)b]} \]

Since:

ROA = \frac{NI}{A}
ROA = \frac{PM(S)}{A}

We can substitute this into the internal growth rate equation and divide both the numerator and denominator by A. This gives:

Internal growth rate = \left\{ \frac{[PM(S)b]}{A} \right\} / \left\{ \frac{[A – PM(S)b]}{A} \right\}
Internal growth rate = \frac{b(ROA)}{[1 – b(ROA)]}

To derive the sustainable growth rate, we must realize that to maintain a constant D/E ratio with no external equity financing, EFN must equal the addition to retained earnings times the D/E ratio:

EFN = (D/E)[PM(S)b(1 + g)]
EFN = A(g) – PM(S)b(1 + g)

Solving for g and then dividing numerator and denominator by A:

Sustainable growth rate = \frac{PM(S)b(1 + D/E)}{[A – PM(S)b(1 + D/E)]}
Sustainable growth rate = \frac{ROA(1 + D/E)b}{[1 – ROA(1 + D/E)b]}
Sustainable growth rate = \frac{b(ROE)}{[1 – b(ROE)]}

29. In the following derivations, the subscript “E” refers to end of period numbers, and the subscript “B” refers to beginning of period numbers. TE is total equity and TA is total assets.

For the sustainable growth rate:

Sustainable growth rate = \frac{(ROE_E \times b)}{(1 – ROE_E \times b)}
Sustainable growth rate = \frac{(NI/TE_E \times b)}{(1 – NI/TE_E \times b)}
We multiply this equation by:

\[(\text{TE}_E / \text{TE}_E)\]

Sustainable growth rate = \((\text{NI} / \text{TE}_E \times b) / (1 – \text{NI} / \text{TE}_E \times b) \times (\text{TE}_E / \text{TE}_E)\)
Sustainable growth rate = \((\text{NI} \times b) / (\text{TE}_E – \text{NI} \times b)\)

Recognize that the denominator is equal to beginning of period equity, that is:

\((\text{TE}_E – \text{NI} \times b) = \text{TE}_B\)

Substituting this into the previous equation, we get:

Sustainable rate = \((\text{NI} \times b) / \text{TE}_B\)

Which is equivalent to:

Sustainable rate = \((\text{NI} / \text{TE}_B) \times b\)

Since \(\text{ROE}_B = \text{NI} / \text{TE}_B\)

The sustainable growth rate equation is:

Sustainable growth rate = \(\text{ROE}_B \times b\)

For the internal growth rate:

Internal growth rate = \((\text{ROA}_E \times b) / (1 – \text{ROA}_E \times b)\)
Internal growth rate = \((\text{NI} / \text{TA}_E \times b) / (1 – \text{NI} / \text{TA}_E \times b)\)

We multiply this equation by:

\[(\text{TA}_E / \text{TA}_E)\]

Internal growth rate = \((\text{NI} / \text{TA}_E \times b) / [(1 – \text{NI} / \text{TA}_E \times b) \times (\text{TA}_E / \text{TA}_E)]\)
Internal growth rate = \((\text{NI} \times b) / (\text{TA}_E – \text{NI} \times b)\)

Recognize that the denominator is equal to beginning of period assets, that is:
\[(T_{AE} - NI \times b) = T_{AB}\]

Substituting this into the previous equation, we get:

Internal growth rate = \[(NI \times b) / T_{AR}\]

Which is equivalent to:

Internal growth rate = \[(NI / T_{AR}) \times b\]

Since ROA_{B} = NI / T_{AR}

The internal growth rate equation is:

Internal growth rate = ROA_{B} \times b
Since the company issued no new equity, shareholders’ equity increased by retained earnings. Retained earnings for the year were:

\[
\text{Retained earnings} = \text{NI} - \text{Dividends}
\]
\[
\text{Retained earnings} = 90,000 - 43,000
\]
\[
\text{Retained earnings} = 47,000
\]

So, the equity at the end of the year was:

\[
\text{Ending equity} = 176,000 + 47,000
\]
\[
\text{Ending equity} = 223,000
\]

The ROE based on the end of period equity is:

\[
\text{ROE} = \frac{90,000}{223,000}
\]
\[
\text{ROE} = 0.4036, \text{ or } 40.36\%
\]

The plowback ratio is:

\[
\text{Plowback ratio} = \frac{\text{Addition to retained earnings}}{\text{NI}}
\]
\[
\text{Plowback ratio} = \frac{47,000}{90,000}
\]
\[
\text{Plowback ratio} = 0.5222, \text{ or } 52.22\%
\]

Using the equation presented in the text for the sustainable growth rate, we get:

\[
\text{Sustainable growth rate} = \frac{\text{ROE} \times b}{1 - (\text{ROE} \times b)}
\]
\[
\text{Sustainable growth rate} = \frac{0.4036(0.5222)}{1 - 0.4036(0.5222)}
\]
\[
\text{Sustainable growth rate} = 0.2670, \text{ or } 26.70\%
\]

The ROE based on the beginning of period equity is

\[
\text{ROE} = \frac{90,000}{176,000}
\]
\[
\text{ROE} = 0.5114, \text{ or } 51.14\%
\]

Using the shortened equation for the sustainable growth rate and the beginning of period ROE, we get:

\[
\text{Sustainable growth rate} = \text{ROE} \times b
\]
Sustainable growth rate = \( 0.5114 \times 0.5222 \)
Sustainable growth rate = 0.2670, or 26.70%

Using the shortened equation for the sustainable growth rate and the end of period ROE, we get:

\[
\text{Sustainable growth rate} = \text{ROE} \times b
\]

Sustainable growth rate = \( 0.4036 \times 0.5222 \)
Sustainable growth rate = 0.2108, or 21.08%

Using the end of period ROE in the shortened sustainable growth equation results in a growth rate that is too low. This will always occur whenever the equity increases. If equity increases, the ROE based on end of period equity is lower than the ROE based on the beginning of period equity. The ROE (and sustainable growth rate) in the abbreviated equation is based on equity that did not exist when the net income was earned.