Chapter 3 Suggested Problems Solutions

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:

Current sales = Next year's sales / (1 + *g*) = $420,000,000 / (1 + .10) = $381,818,182

And the change in sales is: $420,000,000 – 381,818,182 = $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:

Assets		Liabilities and equity	
Current assets	$76,363,636	Short-term debt	$57,272,727
		Long-term debt	$120,000,000
Fixed assets	286,363,636	Common stock	$48,000,000
		Accumulated retained earnings	137,454,545
		Total equity	$185,454,545
Total assets	$362,727,273	Total liabilities and equity	$362,727,273

b. Since the assets/sales and debt/sales are the percentages given in the problem,

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

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

$$\text{EFN} = \$4,085,455$$

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:

Net income = Profit margin × Sales = .09($420,000,000) = $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:

Addition to retained earnings = Net income(1 – *d*) = $37,800,000(1 – .30) = $26,460,000

So, the new accumulated retained earnings will be:

Accumulated retained earnings = $137,454,545 + 26,460,000 = $163,914,545

The pro forma balance sheet will be:

Assets		Liabilities and equity	
Current assets	$84,000,000	Short-term debt	$63,000,000
		Long-term debt	$120,000,000
Fixed assets	$315,000,000	Common stock	$48,000,000
		Accumulated retained earnings	163,914,545
		Total equity	$211,914,545
Total assets	$399,000,000	Total liabilities and equity	$394,914,545

And EFN = Total assets – Total liabilities and equity = $399,000,000 – 394,914,545
EFN = $4,085,455

10. *a.* Sustainable growth rate = $\frac{\text{ROE} \times b}{1 - \text{ROE} \times b}$

where:
b = Retention ratio = 1 – Payout ratio = .60
So:

Sustainable growth rate = $\frac{.131 \times .60}{1 - .131 \times .60}$ = .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.

13. *a.* 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
ΔSales = Current sales × Sales growth rate = $30,400,000(.15) = $4,560,000
Debt/Sales = $6,400,000/$30,400,000 = .2105
PM = Net income/Sales = $2,392,000/$30,400,000 = .0787
Projected sales = Current sales × (1 + Sales growth rate) = $30,400,000(1 + .15) = $34,960,000
d = Dividends/Net income = $956,800/$2,392,000 = .40

EFN = (.82 × $4,560,000) – (.2105 × $4,560,000) – (.0787 × $34,960,000) × (1 – .40)
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 × Sales = .0787($34,960,000) = $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:
Addition to retained earnings = Net income(1 – *d*) = $2,750,800(1 – .40) = $1,650,480

So, the new accumulated retained earnings will be:
Accumulated retained earnings = $10,400,000 + 1,650,480 = $12,050,480

The pro forma balance sheet will be:

Assets		Liabilities and equity	
Current assets	$8,280,000	Short-term debt	$7,360,000
		Long-term debt	$4,800,000
Fixed assets	20,240,000	Common stock	$3,200,000
		Accumulated retained earnings	12,050,480
		Total equity	$16,350,800
Total assets	$28,520,000	Total liabilities and equity	$27,410,800

Hence,
EFN = Total assets – Total liabilities and equity = $28,520,000 – 27,410,800 = $1,109,520

c. Sustainable growth rate = $\frac{\text{ROE} \times b}{1 - \text{ROE} \times b}$

where:
ROE = Net income/Total equity = $2,392,000/$13,600,000 = .1759
b = Retention ratio = Retained earnings/Net income = $1,435,200/$2,392,000 = .60
So:

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

Assets		Liabilities and equity	
Current assets	$8,280,000	Short-term debt	$7,360,000
		Long-term debt	$4,800,000

Fixed assets	20,240,000	Common stock	$3,200,000
		Accumulated retained earnings	13,150,800
		Total equity	$16,350,800
Total assets	$28,520,000	Total liabilities and equity	$28,510,800

Hence, EFN = Total assets – Total liabilities and equity = $28,520,000 – 28,510,800
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:

PM = 0.093 = NI / Sales = $265,000 / Sales; Sales = $2,849,462

Credit sales are 80 percent of total sales, so:

Credit sales = $2,849,462(0.80) = $2,279,570

Now we can find receivables turnover by:

Receivables turnover = Credit sales / Accounts receivable = $2,279,570 / $145,300 = 15.69 times

Days' sales in receivables = 365 days / Receivables turnover = 365 / 15.69 = 23.27 days

15. The solution to this problem requires a number of steps. First, remember that CA + NFA = 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:
CR = CA / 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 = NI / Sales ➔ NI = Profit margin × Sales = .094($5,780) = $543.32

We now use the net income figure as an input into ROE to find the total equity:
ROE = NI / TE ➔ TE = NI / ROE = $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 = LTD / (CL + LTD + TE)
⇨ LTD = 0.35 * ($950 + LTD + $2,985.27)
⇨ LTD = (0.35 * $3,935.27) / (1-0.35)
⇨ LTD = $2,119

Now, we can find the total debt of the company:
TD = CL + LTD = $950 + $2,119 = $3,069

And, with the total debt, we can find the TD&E, which is equal to TA:
TA = TD + TE = $(3,069 + 2,985.27) = $6,054.27

And finally, we are ready to solve the balance sheet identity as:
NFA = TA – CA = $(6,054.27 – 1,187.50) = $4,866.77

16. This problem requires you to work backward through the income statement. First, recognize that Net income = $(1 - t_C)$*EBT. Plugging in the numbers given and solving for EBT, we get:
EBT = $8,320 / (1 – 0.34) = $12,606.06

Now, we can add interest to EBT to get EBIT as follows:
EBIT = EBT + 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:
EBITD = EBIT + Depreciation = $14,546.06 + 2,730 = $17,276.06

Now, simply plug the numbers into the cash coverage ratio and calculate:
Cash coverage ratio = EBITD / Interest = $17,276.06 / $1,940 = 8.91 times

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

Sales	$ 1,003,320
Costs	780,840
Other expenses	20,520
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) = $36,850

And the addition to retained earnings will be:
Addition to retained earnings = $123,084 – 36,850 = $86,234

The new retained earnings on the pro forma balance sheet will be:
New retained earnings = $176,855 + 86,234 = $263,089
The pro forma balance sheet will look like this:

MOOSE TOURS INC.
Pro Forma Balance Sheet

Assets		Liabilities and Owners' Equity	
Current assets		Current liabilities	
Cash	$ 28,842	Accounts payable	$ 77,520
Accounts receivable	46,398	Notes payable	16,150
Inventory	99,066	Total	$ 93,670
Total	$ 174,306	Long-term debt	150,000
Fixed assets			
Net plant and equipment	470,820	Owners' equity	
		Common stock and paid-in surplus	$ 130,000
		Retained earnings	263,089
		Total	$ 393,089
		Total liabilities and owners' equity	$ 636,759
Total assets	$ 645,126		

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

22. First, we need to calculate full capacity sales, which is:
Full capacity sales = $836,100 / .80 = $1,045,125

The full capacity ratio at full capacity sales is:
Full capacity ratio = Fixed assets / Full capacity sales = $392,350 / $1,045,125 = .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 = ($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:
EFN = ($174,306 + 392,350) – $636,759 = –$70,103

23. The D/E ratio of the company is:
D/E = ($80,750 + 150,000) / $306,855 = .75198

So the new total debt amount will be:
New total debt = .75198($393,089) = $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:
Spontaneous increase in accounts payable = $64,600(.20) = $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:
EFN = New total debt – (Beginning LTD + Beginning CL + Spontaneous increase in AP)
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

Assets		Liabilities and Owners' Equity	
Current assets		Current liabilities	
Cash	$ 28,842	Accounts payable	$ 77,520
Accounts receivable	46,398	Notes payable	16,150
Inventory	99,066	Total	$ 93,670
Total	$ 174,306	Long-term debt	201,926
Fixed assets			
Net plant and equipment	470,820	Owners' equity	
		Common stock and paid-in surplus	$ 130,000
		Retained earnings	263,089
		Total	$ 393,089
		Total liabilities and owners'	
Total assets	$ 645,126	equity	$ 688,685

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

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

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

So, the repurchases of debt and equity will be:
Debt repurchase = ($93,670 + 201,926) – 276,900 = $18,696 = $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

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