

Solutions Manual  
for  
Corporate Finance Online (CFO)

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**PEARSON**

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**PEARSON**

## Chapter 1

### MyFinanceLab Solutions Manual

#### Problem 1.LO2.1

Which of the following are financial decisions? (Choose the correct answer.)

- ☐ A. determining whether to buy or lease a car
- ☐ B. planning to pay for college
- ☐ C. retirement planning
- ☒ D. all of the above

#### Problem 1.LO2.2

Determining how the company will fund its operations is called the \_\_\_\_\_ decision. (Choose the correct answer.)

- ☐ A. dividend
- ☐ B. equity
- ☐ C. investment
- ☒ D. capital structure

#### Problem 1.LO2.3

Determining whether to return money to shareholders or invest in growth opportunities is called the \_\_\_\_\_ decision. (Choose the correct answer.)

- ☐ A. investment
- ☒ B. dividend
- ☐ C. equity
- ☐ D. capital structure

## Problem 1.LO2.4

\_\_\_\_\_ banks help companies raise money from investors by selling their stocks and bonds.

- ☐ A. Credit Union
- ☒ B. Investment
- ☐ C. Savings and Loan
- ☐ D. Commercial

## Problem 1.LO3.5

The popularity of money market mutual funds is best explained by which of the following?

(Select the best choice below.)

- ☐ A. The fact that they are insured, like bank deposits.
- ☒ B. The desire of small investors to earn returns that exceed interest paid on bank deposits.
- ☐ C. Money market mutual funds allow small investors to earn high returns by enabling them to assume greater risk.
- ☐ D. Because mutual funds are often large, they carry implicit guarantees by the federal government to safeguard investors against failure.
- ☐ E. As a last resort, investors can always sell mutual fund shares to a Federal Reserve bank.



## Chapter 1

### MyFinanceLab Solutions Manual

#### Problem 1.LO3.6

Because common stockholders have a right to the cash flows remaining after all claims on the corporation have been satisfied, they are known as:

(Select the best choice below.)

- ☐ A. Limited liability participants.
- ☐ B. Fiduciary claimants.
- ☐ C. Principal shareholders.
- ☒ D. Residual claimants.
- ☐ E. Preferred shareholders.

#### Problem 1.LO3.7

\_\_\_\_\_ have a higher payment priority than do \_\_\_\_\_. (Complete this sentence below.)

Preferred dividends have a higher payment priority than do common dividends. (Select from the drop-down menus.)

## Problem 1.LO3.8

What word do we use for the ease with which assets can be converted into cash?

(Select the best choice below.)

- ☐ A. Efficiency.
- ☐ B. Accuracy.
- ☐ C. Agency.
- ☒ D. Liquidity.
- ☐ E. Solvency.

## Problem 1.LO3.9

\_\_\_\_\_ markets are for securities offered for sale for the first time. (Complete this sentence below.)

Primary markets are for securities offered for sale for the first time. (Select from the drop-down menu.)

## Chapter 1

### MyFinanceLab Solutions Manual

#### Problem 1.LO4.10

Managers of corporations should act in ways that:

(Select the best choice below.)

- ☐ A. Produce the most technologically advanced products.
- ☒ B. Maximize shareholder wealth.
- ☐ C. Benefit society, even if shareholders do not materially prosper.
- ☐ D. Increase sales volume.
- ☐ E. Maximize profits.

#### Problem 1.LO4.11

Agency costs refer to:

(Select the best choice below.)

- ☐ A. The costs that result from default and bankruptcy of a firm.
- ☒ B. The costs of any conflicts of interest between stockholders and management.
- ☐ C. The total dividends paid to stockholders over the lifetime of a firm.
- ☐ D. Corporate income subject to double taxation.
- ☐ E. The total interest paid to creditors over the lifetime of the firm.

## Problem 1.LO4.12

\_\_\_\_\_ refers to the way an organization is formed, structured, and controlled. (Complete this sentence below.)

Governance refers to the way an organization is formed, structured, and controlled. (Select from the drop-down menu.)

## Problem 1.LO4.13

Which of the following is not one of the three basic forms of business organization?

(Select the best choice below.)

- ☐ A. Corporation.
- ☒ B. Entrepreneurship.
- ☐ C. Sole Proprietorship.
- ☐ D. Partnership.

## Problem 1.LO4.14

What is a type of business entity that is independent of its owners, the shareholders?

(Select the best choice below.)

- ☐ A. Partnership.
- ☒ B. Corporation.
- ☐ C. Sole Proprietorship.
- ☐ D. Entrepreneurship.

## Chapter 1

### MyFinanceLab Solutions Manual

#### Problem 1.LO5.15

The relationship between risk and return in finance can best be described by which of the following statements?

(Select the best choice below.)

- ☒ A. The riskier the security, the greater the return the investors expect from it.
- ☐ B. Riskier securities provide higher commissions to brokers who sell them.
- ☐ C. Riskier securities are more likely to be returned to brokers by unhappy buyers.
- ☐ D. The riskier the security, the more the government regulates the firms selling it.
- ☐ E. The riskier the security, the lower the return expected from it.

#### Problem 1.LO5.16

Which of the following is not an example of a situation in which asymmetric information is present?

(Select the best choice below.)

- ☐ A. You consider what topics to study for a marketing quiz next week.
- ☐ B. A business owner applies for a loan at a bank and must disclose information about the expected earnings from the project to be funded by the loan.
- ☐ C. You purchase one pound of ground beef at the local supermarket.
- ☐ D. Your friend attempts to purchase an auto insurance contract.
- ☒ E. None of the above.

## Problem 1.LO3.17

The largest providers of funds in the financial system are:

(Select the best choice below.)

- ☐ A. Businesses.
- ☐ B. Government agencies.
- ☒ C. Individuals.
- ☐ D. Bill and Melinda Gates.

## Problem 1.LO3.18

All of the following are characteristics of common stock EXCEPT:

(Select the best choice below.)

- ☐ A. That there is no fixed payment obligation.
- ☐ B. Claims on income and assets which are subordinate to the creditors of the firm.
- ☐ C. Voting rights which permit selection of the firm's directors.
- ☒ D. Tax-deductible dividends.

## Problem 1.LO3.19

The primary market is the only market in which the issuer is directly involved in the transaction and receives direct benefits from the issue. Is this statement true or false?

The statement is **true**. (Select from the drop-down menu.)

## Chapter 1

### MyFinanceLab Solutions Manual

#### Problem 1.LO4.20

Agency problems are most likely associated with which situation?

(Select the best choice below.)

- ☐ A. Corporate managers are poorly paid and seek "fairness" by using company autos and office telephones to make personal calls.
- ☐ B. A decline in employee loyalty resulting from recent corporate "downsizing" strategies.
- ☐ C. Once a broker earns a commission for selling shares, a disgruntled investor cannot get a refund.
- ☐ D. Accountants hired for short-term assignments from temp agencies often make costly mistakes.
- ☒ E. Owners of many corporations do not manage them on a day-to-day basis.

#### Problem 1.LO5.21

Which of the following is not a finance maxim mentioned in your text?

(Select the best choice below.)

- ☐ A. Investors will not delay consumption unless they expect to get something extra in return, nor will they incur risk without being compensated for that risk.
- ☒ B. A dollar received in the future is worth more than a dollar received today.
- ☐ C. Cash flows determine value.
- ☐ D. Good deals go to the investor who is able to recognize them and reacts first.
- ☐ E. Asymmetric information is the difference in the information set held by different participants in the financial marketplace. These differences must be addressed by business participants.

## Problem 1.LO5.22

\_\_\_\_\_ is the variability in returns associated with an investment. (Complete this sentence below.)

Risk is the variability in returns associated with an investment. (Select from the drop-down menu.)

## Problem 1.LO5.23

Information asymmetry means that all market participants have exactly the same information set with which to make decisions. Is this statement true or false?

The statement is false . (Select from the drop-down menu.)

## Problem 1.LO4.24

Which of the following is a major disadvantage of a sole proprietorship?

(Select the best choice below.)

- ☐ A. Agency problems.
- ☐ B. Joint liability.
- ☒ C. Unlimited liability.
- ☐ D. Expensive to setup.



## Chapter 1

### MyFinanceLab Solutions Manual

#### Problem 1.LO4.25

Who is responsible for hiring senior management and setting their compensation?

(Select the best choice below.)

- ☐ A. CEO.
- ☐ B. President.
- ☐ C. Shareholders.
- ☒ D. Board of Directors.

#### Problem 1.LO4.26

Which of the following is not a key provision of the Sarbanes-Oxley Act?

(Select the best choice below.)

- ☐ A. Requires disclosure of all material off-balance sheet activities.
- ☐ B. Stiffened criminal penalties for fraudulent disclosure.
- ☐ C. Requires a committee of outside directors to review firm's audits.
- ☒ D. Prohibits the CEO from serving on the Board of Directors.
- ☐ E. Requires CEOs and CFOs to certify the financial statements.

## Problem 1.LO5.27

In Market A, widgets are selling for \$11. In Market B, identical widgets are selling for \$14. Recognizing the price difference, you buy widgets from Market A and sell them in Market B. This is an example of:

(Select the best choice below.)

- ☐ A. Law of one price.
- ☐ B. Efficient markets.
- ☐ C. Information asymmetry.
- ☒ D. Arbitrage.

## Chapter 2

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### MyFinanceLab Solutions Manual

#### Problem 2.LO1.1

Which of the following is a variation of the accounting identity?

---

(Select the best choice below.)

- ☒ A. *Owner's Equity = Assets - Liabilities*
- ☐ B. *Assets + Lease obligations = Equity + Liabilities*
- ☐ C. *Assets - Fixed assets = Equity - Liabilities*
- ☐ D. *Assets + Equity = Liabilities*
- ☐ E. *Equity - Liabilities = Assets*

## Problem 2.LO1.2

What do balance sheets do?

(Select the best choice below.)

- ☐ A. Provide information about a firm's labor costs.
- ☒ B. Show how the firm raised funds to purchase assets.
- ☐ C. Report a firm's activities over a period of time.
- ☐ D. May not balance if the firm suffered a net loss.
- ☐ E. Describe a firm's cash flows.

## Chapter 2

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### MyFinanceLab Solutions Manual

#### Problem 2.LO1.3

The right-hand side of the balance sheet shows:

---

(Select the best choice below.)

- ☐ A. Profits earned by the firm in the current period
- ☒ B. How the firm financed its assets.
- ☐ C. The cash flow generated by a firm's assets.
- ☐ D. The level of accumulated depreciation
- ☐ E. The firm's good will.

## Problem 2.LO1.4

The \_\_\_\_\_ is a snapshot of the firm at a particular point in time. (Complete this sentence below.)

---

The **balance sheet** is a snapshot of the firm at a particular point in time. (Select from the drop-down menu.)

## Chapter 2

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### MyFinanceLab Solutions Manual

#### Problem 2.LO1.5

An income statement contains all of the following except:

---

(Select the best choice below.)

- ☒ A. Assets
- ☐ B. Revenues
- ☐ C. Losses
- ☐ D. Gains
- ☐ E. Expenses

## Problem 2.LO1.6

Which of the following is not included in a cash flow statement?

(Select the best choice below.)

- ☐ A. Cash flow from operations.
- ☐ B. Changes in inventory and accounts receivable.
- ☐ C. The increase in long-term debt.
- ☐ D. Depreciation expense.
- ☒ E. Labor productivity.



## Chapter 2

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### MyFinanceLab Solutions Manual

#### Problem 2.LO1.7

Which of the following is another way to think about the accounting identity?

---

(Select the best choice below.)

- ☐ A.  $\text{Investments} = \text{Short-term investments} + \text{Long-term investments}$
- ☒ B.  $\text{Investments} = \text{Investments paid for with debt} + \text{Investments paid for with equity}$
- ☐ C.  $\text{Investments} = \text{Investments paid for with cash} + \text{Investments paid for with equity}$
- ☐ D.  $\text{Investments} = \text{Investments paid for with debt} + \text{Investments paid for with cash}$

## Problem 2.LO2.8

What are you not likely to find when conducting financial analysis?

(Select the best choice below.)

- ☐ A. Indicators of what the company's strengths may be.
- ☐ B. Red flags that suggest areas for further study.
- ☒ C. Absolute answers to specific questions when using ratios.
- ☐ D. Indicators of what the company's weaknesses may be.

## Chapter 2

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### MyFinanceLab Solutions Manual

#### Problem 2.LO3.9

In cross-sectional analysis, a firm's financial ratios are:

---

(Select the best choice below.)

- ☐ A. Compared with ratios from all firms.
- ☐ B. Compared with the firm's ratios from the most recent period.
- ☐ C. Plotted over time to isolate trends.
- ☐ D. Compared with a general standard.
- ☒ E. Judged against the performance of firms in the same industry or if no clear industry is apparent, to firms with similar characteristics.

## Problem 2.LO3.10

The four-digit codes used by the government to classify firms into industries are known as:

(Select the best choice below.)

- ☐ A. Ratio standards.
- ☐ B. EIC codes.
- ☒ C. SIC codes.
- ☐ D. Financial benchmarks.
- ☐ E. USIC codes.

## Chapter 2

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### MyFinanceLab Solutions Manual

#### Problem 2.LO3.11

In common-sized financial statements:

---

(Select the best choice below.)

- ☐ A. Net income is divided by total assets.
- ☐ B. Accrued taxes are divided by total sales.
- ☒ C. Depreciation expense is divided by total sales.
- ☐ D. Total sales are divided by total assets.
- ☐ E. All balance sheet items are divided by total liabilities.

## Problem 2.LO3.12

Find the return on assets if net income was \$55,000, total assets are \$115,000, EBIT was \$100,000, and equity is \$75,000.

---

The return on assets is:

$$\text{Return on assets} = \frac{\text{Net income}}{\text{Total assets}}$$

$$\text{Return on assets} = \frac{\$55,000}{\$115,000} = 47.8\%$$

## Chapter 2

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### MyFinanceLab Solutions Manual

#### Problem 2.LO3.13

What is the return on equity if net income was \$55,000, total assets are \$115,000, EBIT was \$100,000, and stockholder's equity is \$75,000.

---

The return on equity is:

$$\text{Return on equity} = \frac{\text{Net income}}{\text{Common stockholders' equity}}$$

$$\text{Return on equity} = \frac{\$55,000}{\$75,000} = 73.3\%$$

## Problem 2.LO3.14

Sales for a firm are \$500,000, cost of goods sold are \$400,000, and interest expenses are \$20,000. What is the gross profit margin?

---

The gross profit is:

$$\text{Gross profit} = \text{Sales} - \text{Cost of goods sold}$$

$$\text{Gross profit} = \$500,000 - \$400,000 = \$100,000$$

The gross profit margin is:

$$\text{Gross profit margin} = \frac{\text{Gross profit}}{\text{Sales}}$$

$$\text{Gross profit margin} = \frac{\$100,000}{\$500,000} = 20\%$$



## Chapter 2

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### MyFinanceLab Solutions Manual

#### Problem 2.LO3.15

If net income was \$10,000, interest expense was \$4,000, and taxes were \$1,000, what is the operating profit margin if sales were \$50,000?

---

The operating profit is:

$$\text{Operating profit} = \text{Net income} + \text{Taxes} + \text{Interest expense}$$

$$\text{Operating profit} = \$10,000 + \$1,000 + \$4,000 = \$15,000$$

The operating profit margin is:

$$\text{Operating profit margin} = \frac{\text{Operating profits}}{\text{Sales}}$$

$$\text{Operating profit margin} = \frac{\$15,000}{\$50,000} = 30\%$$

## Problem 2.LO3.16

The DuPont analysis calculates ROE as the product of:

(Select the best choice below.)

- ☐ A. Leverage, market value, and turnover.
- ☐ B. Activity, leverage, and debt.
- ☐ C. Profitability, liquidity, and leverage.
- ☒ D. Margin, turnover, and leverage.
- ☐ E. Margin, profitability, and leverage.

## Chapter 2

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### MyFinanceLab Solutions Manual

#### Problem 2.LO3.17

When financial ratios are compared to financial ratios from previous years, a \_\_\_\_\_ analysis is conducted. (Complete this sentence below.)

---

When financial ratios are compared to financial ratios from previous years, a **time series** analysis is conducted. (Select from the drop-down menu.)

## Problem 2.LO3.18

All of the following are problems with cross-sectional financial analysis except that:

(Select the best choice below.)

- ☒ A. It provides no basis for comparison to other firms.
- ☐ B. Annual reports sometimes do not disclose divisional financial data.
- ☐ C. An industry may be dominated by a few firms.
- ☐ D. Many firms are conglomerates.
- ☐ E. There may be no obvious firms to be used for comparison.

## Chapter 2

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### MyFinanceLab Solutions Manual

#### Problem 2.LO3.19

Sales for a firm are \$500,000, cost of goods sold are \$400,000, and interest expenses are \$20,000. What is the gross profit margin?

---

The gross profit is:

$$\text{Gross profit} = \text{Sales} - \text{Cost of goods sold}$$

$$\text{Gross profit} = \$500,000 - \$400,000 = \$100,000$$

The gross profit margin is:

$$\text{Gross profit margin} = \frac{\text{Gross profit}}{\text{Sales}}$$

$$\text{Gross profit margin} = \frac{\$100,000}{\$500,000} = 20\%$$

## Problem 2.LO3.20

If net income was \$10,000, interest expense was \$4,000, and taxes were \$1,000, what is the operating profit margin if sales were \$50,000?

The operating profit is:

$$\text{Operating profit} = \text{Net income} + \text{Taxes} + \text{Interest expense}$$

$$\text{Operating profit} = \$10,000 + \$1,000 + \$4,000 = \$15,000$$

The operating profit margin is:

$$\text{Operating profit margin} = \frac{\text{Operating profits}}{\text{Sales}}$$

$$\text{Operating profit margin} = \frac{\$15,000}{\$50,000} = 30\%$$

## Chapter 2

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### MyFinanceLab Solutions Manual

#### Problem 2.LO3.21

If net income was \$10,000, interest expense was \$4,000, and taxes were \$1,000, what is the operating profit margin if sales were \$50,000?

---

The operating profits is:

$$\text{Operating profits} = \text{Net income} + \text{Interest expense} + \text{Taxes}$$

$$\text{Operating profits} = \$10,000 + \$4,000 + \$1,000 = \$15,000$$

The operating profit margin is:

$$\text{Operating profit margin} = \frac{\text{Operating profits}}{\text{Sales}}$$

$$\text{Operating profit margin} = \frac{\$15,000}{\$50,000} = 30\%$$

## Problem 2.LO3.22

What is the quick ratio if cash is \$10,000, accounts receivable are \$25,000, inventories are \$30,000, accounts payable are \$40,000, and accrued payroll is \$15,000?

The quick ratio is:

$$\text{Quick ratio} = \frac{\text{Current assets} - \text{Inventory}}{\text{Current liabilities}}$$

$$\text{Current assets} = \text{Cash} + \text{Accounts receivables} + \text{Inventory}$$

$$\text{Current assets} = \$10,000 + \$25,000 + \$30,000 = \$65,000$$

$$\text{Quick ratio} = \frac{\$65,000 - \$30,000}{\$40,000 + \$15,000} = 0.64$$



## Chapter 2

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### MyFinanceLab Solutions Manual

#### Problem 2.LO3.23

What is the current ratio if cash is \$10,000, accounts receivable are \$25,000, inventories are \$30,000, accounts payable are \$40,000, and accrued payroll is \$15,000?

---

The current ratio is:

$$\text{Current ratio} = \frac{\text{Current assets}}{\text{Current liabilities}}$$

$$\text{Current ratio} = \frac{\$10,000 + \$25,000 + \$30,000}{\$40,000 + \$15,000} = 1.18$$

## Problem 2.LO3.24

The quick ratio is 1.00. Current assets are \$80,000 and current liabilities are \$100,000. What is the amount in the inventory account?

The quick ratio is:

$$\text{Quick ratio} = \frac{\text{Current assets} - \text{Inventory}}{\text{Current liabilities}}$$

$$\text{Inventory} = \text{Current assets} - (\text{Quick ratio} \times \text{Current liabilities})$$

!ERROR: F3

## Chapter 2

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### MyFinanceLab Solutions Manual

#### Problem 2.LO3.25

A firm has sales of \$1 million, net income of \$250,000, total current assets of \$300,000, and accounts receivable of \$200,000. The firm's accounts receivable turnover is:

---

The firm's accounts receivable turnover is:

$$\text{Accounts receivable turnover} = \frac{\text{Sales}}{\text{Accounts receivable}}$$

$$\text{Accounts receivable turnover} = \frac{\$1,000,000}{\$200,000} = 5 \text{ times}$$

## Problem 2.LO3.26

What is a firm's debt ratio if its total assets are \$135,000, equity is \$30,000, current liabilities are \$24,000, and total liabilities are \$105,000?

The debt ratio is:

$$\text{Debt ratio} = \frac{\text{Total liabilities}}{\text{Total assets}}$$

$$\text{Debt ratio} = \frac{\$105,000}{\$135,000} = 78\%$$

## Chapter 2

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### MyFinanceLab Solutions Manual

#### Problem 2.LO3.27

If a firm has 100,000 shares of common stock outstanding and has just recorded a \$45,000 profit, what is its price/earnings ratio if its current share price is \$35?

---

The firm's earnings per share (EPS) is:

$$EPS = \frac{\text{Net income available to common stockholders}}{\text{Number of shares outstanding}}$$

$$EPS = \frac{\$45,000}{100,000 \text{ shares}} = \$0.45$$

The price/earnings (PE) ratio is:

$$PE = \frac{\text{Market price of common stock}}{\text{Earnings per share}}$$

$$PE = \frac{\$35 \text{ per share}}{\$0.45 \text{ per share}} = 77.8$$

## Problem 2.LO3.28

Suppose Lacey Corporation has total credit sales of \$750,000. If the balance sheet reports accounts receivable of \$51,369, what is Lacey's average collection period (assume a 365-day year.)?

The average collection period is:

$$\text{Average collection period} = \frac{\text{Accounts receivable}}{\text{Daily credit sales}}$$

$$\text{Average collection period} = \frac{\$51,369}{\frac{\$750,000}{365 \text{ days}}} = 25 \text{ days}$$

## Chapter 2

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### MyFinanceLab Solutions Manual

#### Problem 2.LO3.29

Claire's Cosmetics maintains a net profit margin of 9.89% and a total asset turnover ratio of 1.44. Calculate the return on assets (ROA) of the firm. If its debt-equity ratio is 41%, long-term debt is \$19,000, interest payments and taxes are each \$4,800, and EBIT is \$31,000, what is its return on equity (ROE)? Calculate the ratio that shows Claire's ability to meet the interest payments (times interest earned, TIE, ratio).

---

The return on assets (ROA) of the firm is:

$$ROA = \frac{\text{Net profit}}{\text{Sales}} \times \frac{\text{Sales}}{\text{Total assets}} = \frac{\text{Net profit}}{\text{Total assets}}$$

$$ROA = \text{Net profit margin} \times \text{Total asset turnover}$$

$$ROA = 9.89\% \times 1.44 = 14.24\%$$

The net income is:

$$\text{Net income} = \text{EBIT} - \text{Interest} - \text{Taxes}$$

$$\text{Net income} = \$31,000 - \$4,800 - \$4,800 = \$21,400$$

The equity of the company is:

$$\text{Equity} = \frac{\text{Long-term debt}}{\text{Debt-equity ratio}}$$

$$\text{Equity} = \frac{\$19,000}{41\%} = \$46,341$$

The return on equity (ROE) is:

$$ROE = \frac{\text{Net income}}{\text{Equity}}$$

Problem 2.LO3.29 (cont.)

$$ROE = \frac{\$21,400}{\$46,341} = 46.18\%$$

The times interest earned (TIE) ratio is:

$$TIE = \frac{EBIT}{Interest}$$

$$TIE = \frac{\$31,000}{\$4,800} = 6.46$$



## Chapter 2

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### MyFinanceLab Solutions Manual

#### Problem 2.LO3.30

Skip's Repair Shop has an average accounts receivable of \$9,474. Sales for the year were \$16,870. What is the shop's accounts receivable turnover? Using this answer, compute the average collection period. (Assume a 365-day year.)

---

The accounts receivable turnover is:

$$\text{Accounts receivable turnover} = \frac{\text{Sales}}{\text{Accounts receivable}}$$

$$\text{Accounts receivable turnover} = \frac{\$16,870}{\$9,474} = 1.78$$

The days sales in receivables (average collection period) is:

$$\text{Average collection period} = \frac{365 \text{ days}}{\text{Accounts receivable turnover}}$$

$$\text{Average collection period} = \frac{365 \text{ days}}{1.78} = 205.1 \text{ days}$$

## Problem 2.LO3.31

Assume a national corporation has a net income of \$1.1 million and 134,000 shares of common stock. Currently, the stock is on the market for \$24.00. Compute the earnings per share and the price/earnings ratio.

The earnings per share (EPS) is:

$$EPS = \frac{\text{Net income available to common stockholders}}{\text{Number of shares outstanding}}$$

$$EPS = \frac{\$1,100,000}{134,000 \text{ shares}} = \$8.21 \text{ per share}$$

The price/earnings (PE) ratio is:

$$PE = \frac{\text{Market price of common stock}}{\text{Earnings per share}}$$

$$PE = \frac{\$24.00 \text{ per share}}{\$8.21 \text{ per share}} = 2.92$$

## Chapter 3

### MyFinanceLab Solutions Manual

#### Problem LO2.1

Calculate the future value of the single cash flow deposited today that will be available at the end of the deposit period if the interest is compounded annually, at the rate specified over the given period.

Single Cash Flow (\$)	Interest Rate (%)	Years	Future Value (\$)
840,000	3	8	
230,000	15	25	
100,000	11	15	
550,000	7	30	

The generalized equation for finding the future value of a deposit is:

$$FV_n = PV_0 \times (1 + i)^n$$

where

$FV_n$  = the future value of a deposit at the end of the  $n$ th period

$PV_0$  = the initial deposit

$i$  = the interest rate earned during each period

$n$  = the number of periods the deposit is allowed to compound

For the first case, substituting  $PV_0 = \$840,000$ ,  $i = 0.03$ , and  $n = 8$  into the future value equation gives the amount at the end of year 8:

$$FV_8 = \$840,000 \times (1 + 0.03)^8 = \$1,064,086.87$$

Thus, the future value of \$840,000 received today and deposited at 3% for 8 years is \$1,064,086.87.

Alternatively, you can find the future value using a financial calculator or an Excel spreadsheet.

#### Calculator solution:

When solving for the future value of a deposit using a financial calculator, you will need to input the values of N, I/Y, PMT, and PV. Make sure you enter a

## Problem LO2.1 (cont.)

zero for PMT, which is not used in the problem. Remember that either FV or PV must be entered as a negative number. Since compounding is annual, the periods per year setting on your calculator should be set at 1, P/Y = 1.

$$\begin{array}{ccccc}
 8 & 3 & -840,000 & 0 & \\
 \boxed{N} & \boxed{I/Y} & \boxed{PV} & \boxed{PMT} & \boxed{FV} \\
 & & & & = \$1,064,086.87
 \end{array}$$

**Spreadsheet solution:**

When solving for the future value of a deposit using an Excel spreadsheet, you will need to write the future value equation and Excel will perform the calculation.

	A	B
1		
2		
3	Problem Data:	
4	PV =	\$840,000
5	n =	8
6	i =	0.03
7		
8	Solution:	
9	FV =	$PV \cdot (1+i)^n$
10	FV =	\$1,064,086.87
11		
Entry in Cell B10 is = B4*(1+B6)^B5.		

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### MyFinanceLab Solutions Manual

#### Problem LO2.1 (cont.)

Follow the same procedure above to compute the future value for other cases in the table.

For the second case, substituting  $PV_0 = \$230,000$ ,  $i = 0.15$ , and  $n = 25$  into the future value equation gives the amount at the end of year 25:

$$FV_{25} = \$230,000 \times (1 + 0.15)^{25} = \$7,571,359.10$$

Thus, the future value of \$230,000 received today and deposited at 15% for 25 years is \$7,571,359.10.

For the third case, substituting  $PV_0 = \$100,000$ ,  $i = 0.11$ , and  $n = 15$  into the future value equation gives the amount at the end of year 15:

$$FV_{15} = \$100,000 \times (1 + 0.11)^{15} = \$478,458.95$$

Thus, the future value of \$100,000 received today and deposited at 11% for 15 years is \$478,458.95.

For the last case, substituting  $PV_0 = \$550,000$ ,  $i = 0.07$ , and  $n = 30$  into the future value equation gives the amount at the end of year 30:

$$FV_{30} = \$550,000 \times (1 + 0.07)^{30} = \$4,186,740.27$$

Thus, the future value of \$550,000 received today and deposited at 7% for 30 years is \$4,186,740.27.

## Problem LO2.2

For each of the following cases, find the future value at the end of the deposit period at the given nominal interest rate.

<b>Number of Compounding Periods in the Year (m)</b>	<b>Initial Deposit (\$)</b>	<b>Nominal Interest Rate (%)</b>	<b>Deposit Periods (Yrs)</b>	<b>Future Value (\$)</b>
1	2,000	22	16	
2	1,100	8	25	
12	1,500	2	7	

The generalized equation for finding the future value of a deposit is:

$$FV_n = PV_0 \times \left(1 + \frac{i}{m}\right)^{n \times m}$$

where

$FV_n$  = the future value of a deposit at the end of the nth year

$PV_0$  = the initial deposit

$i$  = the annual interest rate (or quoted rate)

$n$  = the number of years the deposit is allowed to compound

$m$  = the number of compounding periods in the year

For the first case, substituting  $PV_0 = \$2,000$ ,  $i = 0.22$ ,  $n = 16$ , and  $m = 1$  into the future value equation gives the amount at the end of year 16:

$$FV_{16} = \$2,000 \times \left(1 + \frac{0.22}{1}\right)^{16 \times 1} = \$48,171.18$$

Thus, the future value of \$2,000 received today and deposited at 22% compounded annually for 16 years is \$48,171.18.

Alternatively, you can find the future value using a financial calculator or an Excel spreadsheet.

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### MyFinanceLab Solutions Manual

#### Problem LO2.2 (cont.)

#### Calculator solution:

When solving for the future value of a deposit using a financial calculator, you will need to input the values of N, I/Y, PMT, and PV. Make sure you enter a zero for PMT, which is not used in the problem. Remember that either FV or PV must be entered as a negative number. For annual compounding, the number of compounding periods in the year,  $m$ , is equal to 1. Thus, the input for the total number of periods in 16 years would be  $N = 16 \times 1 = 16$  and the annual interest rate would be  $I = 22\% \div 1 = 22\%$ .

16	22	- 2,000	0	
				
				= \$48,171.18

#### Spreadsheet solution:

When solving for the future value of a single cash flow using an Excel spreadsheet, you will need to write the future value equation and Excel will perform the calculation.

## Problem LO2.2 (cont.)

	A	B
1		
2		
3	Problem Data:	
4	PV =	\$2,000
5	FV =	?
6	n =	16
7	i =	0.22
8	m =	1
9	i/m =	0.22
10	n*m =	16
11		
12		
13	Solution:	
14	FV =	$PV \cdot (1+i/m)^{(n \cdot m)}$
15	FV =	\$48,171.18
16		
Entry in Cell B15 is = B4*(1+B9)^B10.		

Follow the same procedure above to compute the future value for other cases in the table.

For the second case, substituting  $PV_0 = \$1,100$ ,  $i = 0.08$ ,  $n = 25$ , and  $m = 2$  into the future value equation gives the amount at the end of year 25:

$$FV_{25} = \$1,100 \times \left(1 + \frac{0.08}{2}\right)^{25 \times 2} = \$7,817.35$$



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### MyFinanceLab Solutions Manual

#### Problem LO2.2 (cont.)

Thus, the future value of \$1,100 received today and deposited at 4% compounded semi-annually for 25 years is \$7,817.35.

For the last case, substituting  $PV_0 = \$1,500$ ,  $i = 0.02$ ,  $n = 7$ , and  $m = 12$  into the future value equation gives the amount at the end of year 7:

$$FV_7 = \$1,500 \times \left(1 + \frac{0.02}{12}\right)^{7 \times 12} = \$1,725.21$$

Thus, the future value of \$1,500 received today and deposited at 2% compounded monthly for 7 years is \$1,725.21.

## Problem LO2.3

For the following mixed stream of cash flows, determine the future value at the end of the final year if deposits are made at the beginning of each year into an account paying annual interest of 6%, assuming no withdrawals are made during the period.

Year	Cash Flow Stream
1	9,000
2	8,200
3	5,700

To find the future value of a stream of cash flows, first compute the future value of each cash flow and then sum up all the computed future values. The generalized equation for finding the future value of a single cash flow is given as:

$$FV_n = PV_0 \times (1 + i)^n$$

where

$FV_n$  = the future value of a cash flow at the end of the  $n$ th period

$PV_0$  = the present value

$i$  = the interest rate earned during each period

$n$  = the number of periods the cash flow is allowed to compound

Since the first cash flow occurs at the beginning of the first year (at time 0), the cash flow should be compounded for 3 years to find its future value at the end of year 3. Substituting  $PV_0 = \$9,000$ ,  $i = 0.06$ , and  $n = 3$  into the future value equation gives the amount at the end of year 3:

$$FV_3 = \$9,000 \times (1 + 0.06)^3 = \$10,719.14$$

Thus, the future value of \$9,000 deposited at 6% for 3 years is \$10,719.14.

Alternatively, you can find the future value using a financial calculator or an Excel spreadsheet.

**Calculator solution:**

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#### Problem LO2.3 (cont.)

When solving for the future value of a single cash flow using a financial calculator, you will need to input the values of N, I/Y, PMT, and PV. Make sure you enter a zero for PMT, which is not used in the problem. Remember that either FV or PV must be entered as a negative number. Since compounding is annual, the periods per year setting on your calculator should be set at 1, P/Y = 1.

3                  6                  - 9,000                  0                  **FV**  
**N**                  **I/Y**                  **PV**                  **PMT**                  **FV**  
= \$10,719.14

#### Spreadsheet solution:

When solving for the future value of a single cash flow using an Excel spreadsheet, you will need to write the future value equation and Excel will perform the calculation.

	A	B
1		
2		
3	Problem Data:	
4	PV =	\$9,000
5	n =	3
6	i =	0.06
7		
8	Solution:	
9	FV =	$PV*(1+i)^n$
10	FV =	\$10,719.14
11		
Entry in Cell B10 is = B4*(1+B6)^B5.		

## Problem LO2.3 (cont.)

Follow the same steps above to compute the future values of the remaining cash flows.

Since the second cash flow occurs at the beginning of the second year (at time 1), the cash flow should be compounded for 2 years to find its future value at the end of year 3. Substituting  $PV_0 = \$8,200$ ,  $i = 0.06$ , and  $n = 2$  into the future value equation gives the amount at the end of year 3:

$$FV_3 = \$8,200 \times (1 + 0.06)^2 = \$9,213.52$$

Thus, the future value of \$8,200 deposited at 6% for 2 years is \$9,213.52.

Since the last cash flow occurs at the beginning of the third year (at time 2), the cash flow should be compounded for 1 year to find its future value at the end of year 3. Substituting  $PV_0 = \$5,700$ ,  $i = 0.06$ , and  $n = 1$  into the future value equation gives the amount at the end of year 3:

$$FV_3 = \$5,700 \times (1 + 0.06)^1 = \$6,042.00$$

Thus, the future value of \$5,700 deposited at 6% for 1 year is \$6,042.00.

Finally, the future value of the mixed stream of cash flows is the sum of the future values of the three cash flows:

$$FV = \$10,719.14 + \$9,213.52 + \$6,042.00 = \$25,974.66$$

The future value of the stream of cash flows at the end of the final year is \$25,974.66.

Year	Cash Flow Stream
1	9,000
2	8,200
3	5,700
Future Value (\$) =	25,974.66

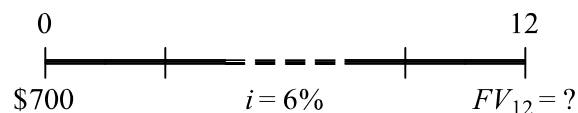
## Chapter 3

### MyFinanceLab Solutions Manual

#### Problem LO2.4

You have \$700 in an account which pays 6% compounded annually. If you invest your money for 12 years, then how many dollars of interest will you earn by the end of the term?

The timeline for the problem is:



Calculate the future value of the original amount and then subtract the original amount. The difference is the total amount of interest earned over the term. The generalized equation for finding the future value of a deposit is given as:

$$FV_n = PV_0 \times (1 + i)^n$$

where

$FV_n$  = the future value of a deposit at the end of the  $n$ th period

$PV_0$  = the initial deposit

$i$  = the interest rate earned during each period

$n$  = the number of periods the deposit is allowed to compound

Substituting  $PV_0 = \$700$ ,  $i = 0.06$ , and  $n = 12$  into the future value equation gives the amount at the end of year 12:

$$FV_{12} = \$700 \times (1 + 0.06)^{12} = \$1,408.54$$

Thus, the future value of \$700 deposited at 6% for 12 years is \$1,408.54.

Alternatively, you can find the future value using a financial calculator or an Excel spreadsheet.

#### Calculator solution:

When solving for the future value of a deposit using a financial calculator, you will need to input the values of N, I/Y, PMT, and PV. Make sure you enter a

Problem LO2.4 (cont.)

zero for PMT, which is not used in the problem. Remember that either FV or PV must be entered as a negative number. Since compounding is annual, the periods per year setting on your calculator should be set at 1, P/Y = 1.

12                  6                  - 700                  0                  FV  
                = \$1,408.54

**Spreadsheet solution:**

When solving for the future value of a deposit using an Excel spreadsheet, you will need to write the future value equation and Excel will perform the calculation.

	A	B
1		
2		
3	Problem Data:	
4	PV =	\$700
5	n =	12
6	i =	0.06
7		
8	Solution:	
9	FV =	$PV*(1+i)^n$
10	FV =	\$1,408.54
11		
Entry in Cell B10 is = B4*(1+B6)^B5.		

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### MyFinanceLab Solutions Manual

#### Problem LO2.4 (cont.)

The total amount of interest earned over the term is the difference between the future value of the original amount and the original amount:

$$\text{Interest earned} = FV_{12} - PV_0 = \$1,408.54 - \$700 = \$708.54$$

## Problem LO2.5

Suppose that the NASDAQ Composite index hit a level of 4,700 in February of 2008. In February of 1995 it was at a level of 2,120. What was the annual average compound growth rate over the period?

The compound annual interest or growth rate can be found using the following equation:

$$i = [FV_n / PV_0]^{1/n} - 1$$

where

$FV_n$  = the future value of the NASDAQ index at the end of the  $n$ th period

$PV_0$  = the NASDAQ index level in 1995

$i$  = the annual growth rate of the NASDAQ index

$n$  = the number of periods the growth is allowed to compound

Substituting  $PV_0 = 2,120$ ,  $FV_n = 4,700$ , and  $n = 13$  into the mathematical equation gives the compound annual growth rate:

$$i = [4,700 / 2,120]^{1/13} - 1 = 0.0632 = 6.32\%$$

The annual average compound growth rate of the NASDAQ Composite index over the period from 1995 to 2008 was 6.32%.

Alternatively, you can find the interest rate using a financial calculator or an Excel spreadsheet.

**Calculator solution:**

When solving for the interest rate of an investment using a financial calculator, you will need to input the values of N, PV, PMT, and FV. Make sure you enter a zero for PMT, which is not used in the problem. Since compounding is annual, the periods per year setting on your calculator should be set at 1,  $P/Y = 1$ . Most calculators require either the PV or the FV value to be input as a negative number to calculate an unknown interest or growth rate.



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#### Problem LO2.5 (cont.)

$$\begin{array}{ccccc} 13 & & -2,120 & & 0 & & 4,700 \\ \boxed{N} & & \boxed{PV} & & \boxed{PMT} & & \boxed{FV} \\ & & = 6.32\% & & & & \end{array}$$

#### Spreadsheet solution:

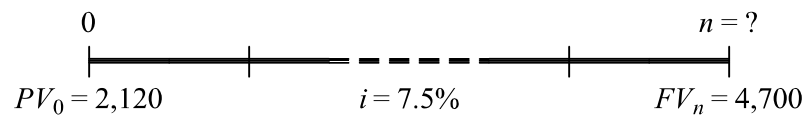
When solving for the interest rate of an investment using an Excel spreadsheet, you will need to write the interest rate equation and Excel will perform the calculation.

	A	B
1		
2		
3	Problem Data:	
4	PV =	2,120
5	FV =	4,700
6	n =	13
7	i =	?
8		
9	Solution:	
10	i =	$(FV/PV)^{(1/n)} - 1$
11	i =	0.0632
12		
Entry in Cell B11 is $= (B5/B4)^{(1/B6)} - 1$ .		

## Problem LO2.6

In February of 2000 the NASDAQ Composite index peaked at a level of 4,700 (just before the Tech Bubble popped). In February of 2006 it was at a level of 2,120. The NASDAQ index has historically grown at an average annual rate of 7.5%. If the index continues to grow at its historic rate, then how many years will it take for the index to grow from its Feb 2006 level back to the Feb 2000 level?

The timeline for the problem is:



The number of periods can be found using the following equation:

$$n = \frac{\log (FV_n / PV_0)}{\log (1 + i)}$$

where

$FV_n$  = the future value of the NASDAQ index at the end of the  $n$ th period

$PV_0$  = the NASDAQ index level in 2006

$i$  = the annual growth rate of the NASDAQ index

$n$  = the number of periods of growth required to return the index to its February 2000 level

Substituting  $PV_0 = 2,120$ ,  $FV_n = 4,700$ , and  $i = 0.075$  into the number of periods equation gives:

$$n = \frac{\log (4,700 / 2,120)}{\log (1 + 0.075)} = 11 \text{ years}$$

Thus, it will take approximately 11 years for the NASDAQ index to grow from its Feb 2006 level back to the Feb 2000 level.

Alternatively, you can find the number of periods using a financial calculator or an Excel spreadsheet.






**Calculator solution:**

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#### Problem LO2.6 (cont.)

When solving for the number of periods of an investment using a financial calculator, you will need to input the values of I/Y, PV, PMT, and FV. Make sure you enter a zero for PMT, which is not used in the problem. Since compounding is annual, the periods per year setting on your calculator should be set at 1, P/Y = 1. Most calculators require either the PV or the FV value to be input as a negative number to calculate an unknown interest or growth rate.

	7.5	- 2,120	0	4,700
				
11				

#### Spreadsheet solution:

When solving for the number of periods of an investment using an Excel spreadsheet, you will need to write the interest rate equation and Excel will perform the calculation.

## Problem LO2.6 (cont.)

	A	B
1		
2		
3	Problem Data:	
4	PV =	2,120
5	FV =	4,700
6	n =	?
7	i =	0.075
8		
9	Solution:	
10	n =	$\log(FV/PV)/\log(1+i)$
11	n =	
12		
Entry in Cell B11 is = log(B5/B4)/log(1+B7).		

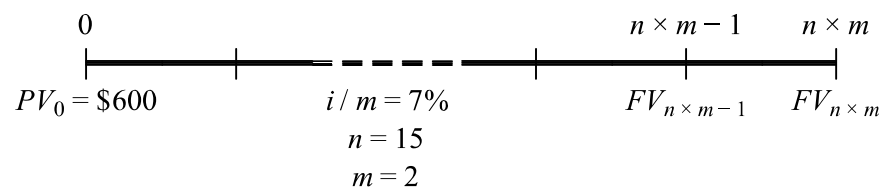
## Chapter 3

### MyFinanceLab Solutions Manual

#### Problem LO2.7

You deposit \$600 in a bank in a 15 year time deposit. With a time deposit you cannot withdraw funds from the account until the end of the term. Interest in the account is compounded semi-annually ( $m = 2$ ) at the annual nominal rate of 14%. In the final compounding interval, what is the dollar amount of interest that is earned from earlier interest (rather than off of the original principal)?

The timeline for the problem is:



The interest in the final period can be divided into two portions: 1) interest on the original principal; and 2) interest on interest. Follow the following steps to find the dollar amount of interest in the final compounding interval that is earned from earlier interest:

1. Compute the account balance at the beginning of the last period.
2. Compute the account balance at the end of the last period.
3. Take the difference of the two future values computed in steps 1 and 2 to find the total interest earned in the final period.
4. Compute the interest on principal in the last period.
5. Subtract the interest on principal from the total interest to find the interest on interest in the last period.

First, compute the future value of the initial deposit. The generalized equation for finding the future value of a single cash flow is given as:

$$FV_{n \times m} = PV_0 \times \left(1 + \frac{i}{m}\right)^{n \times m}$$

where

$FV_{n \times m}$  = the future value of a cash flow at the end of the  $(n \times m)$ th period

$PV_0$  = the present value

$i$  = the interest rate earned during each year

## Problem LO2.7 (cont.)

$n$  = the number of years the cash flow is allowed to compound

$m$  = the number of compounding periods in the year

Substituting  $PV_0 = \$600$ ,  $i = 0.14$ ,  $n = 15$ , and  $m = 2$  into the future value equation gives the amount at the beginning of the last period:



$$FV_{15 \times 2 - 1} = FV_{29} = \$600 \times \left(1 + \frac{0.14}{2}\right)^{15 \times 2 - 1} = \$4,268.55$$

Thus, the account balance at the beginning of the last period is \$4,268.55.

Alternatively, you can find the future value using a financial calculator or an Excel spreadsheet.

**Calculator solution:**

When solving for the future value of a single cash flow using a financial calculator, you will need to input the values of N, I/Y, PMT, and PV. Make sure you enter a zero for PMT, which is not used in the problem. Remember that either FV or PV must be entered as a negative number. For semi-annual compounding, the number of compounding periods in the year,  $m$ , is equal to 2. The amount in the account at the beginning of the last period is the future value of the initial deposit compounded  $n \times m - 1 = 15 \times 2 - 1 = 29$  periods. Thus, the input for the total number of periods would be  $N = 29$  and the semi-annual interest rate would be  $I = 14\% \div 2 = 7\%$ .

29	7	- 600	0	
				
				= \$4,268.55

**Spreadsheet solution:**

When solving for the future value of a single cash flow using an Excel spreadsheet, you will need to write the future value equation and Excel will perform the calculation.

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#### Problem LO2.7 (cont.)

	A	B
1		
2		
3	Problem Data:	
4	PV =	\$600
5	FV =	?
6	n =	15
7	i =	0.14
8	m =	2
9	i/m =	0.07
10	n*m - 1 =	29
11		
12		
13	Solution:	
14	FV =	$PV * (1 + i/m)^{(n*m - 1)}$
15	FV =	\$4,268.55
16		
Entry in Cell B15 is = B4*(1+B9)^B10.		

Similarly, the account balance at the end of the last period can be found by substituting  $PV_0 = \$600$ ,  $i = 0.14$ ,  $n = 15$ , and  $m = 2$  into the future value equation gives the amount at the beginning of the last period:

$$FV_{15 \times 2} = FV_{30} = \$600 \times \left(1 + \frac{0.14}{2}\right)^{15 \times 2} = \$4,567.35$$

Thus, the account balance at the end of the last period is \$4,567.35.

Problem LO2.7 (cont.)

Next, compute the total amount of interest earned in the last period as:

$$\begin{aligned}\text{Total interest earned} &= FV_{n \times m} - FV_{n \times m - 1} \\ &= FV_{30} - FV_{29} = \$4,567.35 - \$4,268.55 = \$298.80\end{aligned}$$

Then, compute the interest earned on the original deposit in the last period as:

$$\text{Interest earned on original deposit} = PV_0 \times (i / m) = \$600 \times (0.14 / 2) = \$42.00$$

The interest generated by the initial deposit of \$600 is only \$42.00.

Thus, in the final period, the interest earned on interest is  $\$298.80 - \$42.00 = \$256.80$ .



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### MyFinanceLab Solutions Manual

#### Problem LO2.8

A bank advertises a nominal annual interest rate of 18.5% on a loan. However, interest is compounded monthly. What is the effective interest rate on the loan?

The effective interest rate (EIR) is the amount you would need to earn with annual compounding to be as well off as you are with multiple compounding periods per year. The effective interest rate is given by:

$$\text{Effective interest rate} = \left( 1 + \frac{i}{m} \right)^m - 1$$

where

$i$  = the quoted annual rate

$m$  = the number of compounding intervals

Substituting  $i = 0.1850$  and  $m = 12$  into the following equation gives the effective annual rate on the loan:

$$\text{Effective interest rate} = \left( 1 + \frac{0.1850}{12} \right)^{12} - 1 = 0.2015$$

Thus, the effective interest rate on the loan is 0.2015 or 20.15%.

## Problem LO3.9

Ted Roberts has been offered the following future payments  $n$  years from today. If his opportunity cost is  $i$ , compounded annually, what value would he place on each opportunity?

Future Value (\$)	Interest Rate (%)	Years	Present Value (\$)
7,800	3	8	
4,500	10	22	
4,200	18	32	
2,300	14	15	

The generalized equation for finding the present value of a single cash flow is given as:

$$PV_0 = \frac{FV_n}{(1 + i)^n}$$

where

$PV_0$  = the present value

$FV_n$  = the future value of a single cash flow at the end of the  $n$ th period

$i$  = the annual interest rate

$n$  = the number of periods

Alternatively, you can find the present value using a financial calculator or an Excel spreadsheet. When solving for the present value of a single cash flow using a financial calculator, you will need to input the values of  $N$ ,  $I/Y$ ,  $PMT$ , and  $FV$ . Make sure you enter a zero for  $PMT$ , which is not used in the problem. When solving for the present value of a single cash flow using an Excel spreadsheet, you will need to write the present value equation and Excel will perform the calculation.

For the first case, substituting  $FV_8 = \$7,800$ ,  $i = 0.03$ , and  $n = 8$  into the present value equation gives the amount at time 0:

$$PV_0 = \frac{\$7,800}{(1 + 0.03)^8} = \$6,157.39$$

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### MyFinanceLab Solutions Manual

#### Problem LO3.9 (cont.)

Thus, the present value of \$7,800 discounted at 3% for 8 years is \$6,157.39.

Alternatively, you can find the present value using a financial calculator or an Excel spreadsheet.

#### Calculator solution:

When solving for the present value of a single cash flow using a financial calculator, you will need to input the values of N, I/Y, PMT, and FV. Make sure you enter a zero for PMT, which is not used in the problem. Remember that either FV or PV must be entered as a negative number. Since compounding is annual, the periods per year setting on your calculator should be set at 1, P/Y = 1.

8	3		0	- 7,800
<b>N</b>	<b>I/Y</b>	<b>PV</b>	<b>PMT</b>	<b>FV</b>
		= \$6,157.39		

#### Spreadsheet solution:

When solving for the present value of a single cash flow using an Excel spreadsheet, you will need to write the present value equation and Excel will perform the calculation.

## Problem LO3.9 (cont.)

	A	B
1		
2		
3	Problem Data:	
4	FV =	\$7,800
5	PV =	?
6	n =	8
7	i =	0.03
8		
9		
10	Solution:	
11	PV =	$FV \cdot (1+i)^{(-n)}$
12	PV =	\$6,157.39
13		
Entry in Cell B12 is = B4*(1+B7)^(-B6).		

Follow the same procedure above to compute the present value for other cases in the table.

For the second case, substituting  $FV_{22} = \$4,500$ ,  $i = 0.10$ , and  $n = 22$  into the present value equation gives the amount at time 0:

$$PV_0 = \frac{\$4,500}{(1 + 0.10)^{22}} = \$552.81$$

Thus, the present value of \$4,500 discounted at 10% for 22 years is \$552.81.

For the third case, substituting  $FV_{32} = \$4,200$ ,  $i = 0.18$ , and  $n = 32$  into the present value equation gives the amount at time 0:

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#### Problem LO3.9 (cont.)

$$PV_0 = \frac{\$4,200}{(1 + 0.18)^{32}} = \$21.04$$

Thus, the present value of \$4,200 discounted at 18% for 32 years is \$21.04.

For the final case, substituting  $FV_{15} = \$2,300$ ,  $i = 0.14$ , and  $n = 15$  into the present value equation gives the amount at time 0:

$$PV_0 = \frac{\$2,300}{(1 + 0.14)^{15}} = \$322.22$$

Thus, the present value of \$2,300 discounted at 14% for 15 years is \$322.22.

## Problem LO3.10

For each of the following cases, find the present value at time zero at the given nominal interest rate.

<b>Number of Compounding Periods in the Year (m)</b>	<b>FV Deposit (\$)</b>	<b>Nominal Interest Rate (%)</b>	<b>Deposit Periods (Yrs)</b>	<b>Present Value (\$)</b>
1	1,400	14	12	
2	1,200	8	16	
12	1,500	2	7	

The generalized equation for finding the present value of a single cash flow is given as:

$$PV_0 = FV_n \times \frac{1}{\left(1 + \frac{i}{m}\right)^{n \times m}}$$

where

$PV_0$  = the present value

$FV_n$  = the future value of a single cash flow at the end of the nth year

$i$  = the annual interest rate

$n$  = the number of years

$m$  = the number of compounding periods in the year

For the first case, substituting  $FV_{12} = \$1,400$ ,  $i = 0.14$ ,  $n = 12$ , and  $m = 1$  into the present value equation gives the amount at time 0:

$$PV_0 = \$1,400 \times \frac{1}{\left(1 + \frac{0.14}{1}\right)^{12 \times 1}} = \$290.58$$

Thus, the present value of \$1,400 discounted at 14% compounded annually for 12 years is \$290.58.

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#### Problem LO3.10 (cont.)

Alternatively, you can find the present value using a financial calculator or an Excel spreadsheet.

#### Calculator solution:

When solving for the present value of a single cash flow using a financial calculator, you will need to input the values of N, I/Y, PMT, and FV. Make sure you enter a zero for PMT, which is not used in the problem. Remember that either FV or PV must be entered as a negative number. For annual compounding, the number of compounding periods in the year,  $m$ , is equal to 1. Thus, the input for the total number of periods in 12 years would be  $N = 12 \times 1 = 12$  and the annual interest rate would be  $I = 14\% \div 1 = 14\%$ .

12	14		0	- 1,400
				
		= \$290.58		

#### Spreadsheet solution:

When solving for the present value of a single cash flow using an Excel spreadsheet, you will need to write the present value equation and Excel will perform the calculation.

## Problem LO3.10 (cont.)

	A	B
1		
2		
3	Problem Data:	
4	FV =	\$1,400
5	PV =	?
6	n =	12
7	i =	0.14
8	m =	1
9	i/m =	0.14
10	n*m =	12
11		
12	Solution:	
13	PV =	$FV * 1 / (1 + i/m)^{(n*m)}$
14	PV =	\$290.58
15		
Entry in Cell B14 is = B4*1/(1+B9)^(B10).		

Follow the same procedure above to compute the present value for other cases in the table.

For the second case, substituting  $FV_{16} = \$1,200$ ,  $i = 0.08$ ,  $n = 16$ , and  $m = 2$  into the present value equation gives the amount at time 0:

$$PV_0 = \$1,200 \times \frac{1}{\left(1 + \frac{0.08}{2}\right)^{16 \times 2}} = \$342.07$$



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#### Problem LO3.10 (cont.)

Thus, the present value of \$1,200 discounted at 8% compounded semi-annually for 16 years is \$342.07.

For the last case, substituting  $FV_7 = \$1,500$ ,  $i = 0.02$ ,  $n = 7$ , and  $m = 12$  into the present value equation gives the amount at time 0:

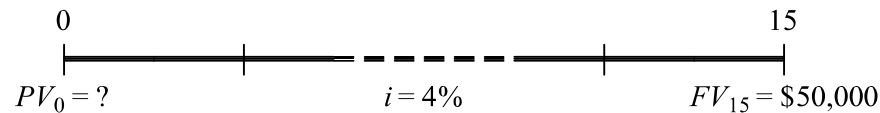
$$PV_0 = \$1,500 \times \frac{1}{\left(1 + \frac{0.02}{12}\right)^{7 \times 12}} = \$1,304.19$$

Thus, the present value of \$1,500 discounted at 2% compounded monthly for 7 years is \$1,304.19.

## Problem LO3.11

Maria expects to receive a payment of \$50,000 in 15 years. At a discount rate of 4%, what is the present value of this payment?

The timeline for the problem is:



The generalized equation for finding the present value of a single cash flow is given as:

$$PV_0 = \frac{FV_n}{(1 + i)^n}$$

where

$PV_0$  = the present value

$FV_n$  = the future value of a single cash flow at the end of the  $n$ th period

$i$  = the interest rate earned during each period

$n$  = the number of periods the interest is allowed to compound

Substituting  $FV_{15} = \$50,000$ ,  $i = 0.04$ , and  $n = 15$  into the present value equation gives the amount at time 0:

$$PV_0 = \frac{\$50,000}{(1 + 0.04)^{15}} = \$27,763.23$$

Thus, the present value of \$50,000 discount at 4% for 15 years is \$27,763.23.

Alternatively, you can find the present value using a financial calculator or an Excel spreadsheet.

**Calculator solution:**






When solving for the present value of a single cash flow using a financial calculator, you will need to input the values of N, I/Y, PMT, and FV. Make sure you

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#### Problem LO3.11 (cont.)

enter a zero for PMT, which is not used in the problem. Remember that either FV or PV must be entered as a negative number. Since compounding is annual, the periods per year setting on your calculator should be set at 1, P/Y = 1.

15	4		0	- 50,000
				
$= 27,763.23$				

#### Spreadsheet solution:

When solving for the present value of a single cash flow using an Excel spreadsheet, you will need to write the present value equation and Excel will perform the calculation.

## Problem LO3.11 (cont.)

	A	B
1		
2		
3	Problem Data:	
4	FV =	\$50,000
5	PV =	?
6	n =	15
7	i =	0.04
8		
9		
10	Solution:	
11	PV =	$FV \cdot (1+i)^{-n}$
12	PV =	\$27,763.23
13		
Entry in Cell B12 is = B4*(1+B7)^(-B6).		

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#### Problem LO3.12

Find the present value of the following mixed stream of cash flows using a discount rate of 5%. Assume the cash flows are received at the end of each year.

Year	Cash Flow Stream
1	17,000
2	13,000
3	16,000

To find the present value of a stream of cash flows, first compute the present value of each cash flow and then sum up all the computed present values. The generalized equation for finding the present value of a single cash flow is given as:

$$PV_0 = \frac{FV_n}{(1+i)^n}$$

where

$PV_0$  = the present value

$FV_n$  = the future value of a single cash flow at the end of the  $n$ th period

$i$  = the annual interest rate

$n$  = the number of periods

Since the first cash flow occurs at the end of the first year (at time 1), the cash flow should be discounted for 1 year to find its present value at time 0. Substituting  $FV_1 = \$17,000$ ,  $i = 0.05$ , and  $n = 1$  into the present value equation gives the amount at time 0:

$$PV_0 = \frac{\$17,000}{(1+0.05)^1} = \$16,190.48$$

Thus, the present value of \$17,000 discounted at 5% for 1 year is \$16,190.48.

Alternatively, you can find the future value using a financial calculator or an Excel spreadsheet.

#### Calculator solution:

## Problem LO3.12 (cont.)

When solving for the present value of a single cash flow using a financial calculator, you will need to input the values of N, I/Y, PMT, and FV. Make sure you enter a zero for PMT, which is not used in the problem. Remember that either FV or PV must be entered as a negative number. Since compounding is annual, the periods per year setting on your calculator should be set at 1,  $P/Y = 1$ .

1	5		0	- 17,000
<b>N</b>	<b>I/Y</b>	<b>PV</b>	<b>PMT</b>	<b>FV</b>
		= 16,190.48		

**Spreadsheet solution:**

When solving for the present value of a single cash flow using an Excel spreadsheet, you will need to write the present value equation and Excel will perform the calculation.

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#### MyFinanceLab Solutions Manual

#### Problem LO3.12 (cont.)

	A	B
1		
2		
3	Problem Data:	
4	FV =	\$17,000
5	PV =	?
6	n =	1
7	i =	0.05
8		
9		
10	Solution:	
11	PV =	$FV \cdot (1+i)^{-n}$
12	PV =	\$16,190.48
13		
Entry in Cell B12 is = B4*(1+B7)^(-B6).		

Follow the same steps above to compute the future values of the remaining cash flows.

Since the second cash flow occurs at the end of the second year (at time 2), the cash flow should be discounted for 2 years to find its present value at time 0. Substituting  $FV_2 = \$13,000$ ,  $i = 0.05$ , and  $n = 2$  into the present value equation gives the amount at time 0:

$$PV_0 = \frac{\$13,000}{(1 + 0.05)^2} = \$11,791.38$$

Thus, the present value of \$13,000 discounted at 5% for 2 years is \$11,791.38.

Since the last cash flow occurs at the end of the third year (at time 3), the cash flow should be discounted for 3 years to find its present value at time 0.

Problem LO3.12 (cont.)

Substituting  $FV_3 = \$17,000$ ,  $i = 0.05$ , and  $n = 3$  into the present value equation gives the amount at time 0:

$$PV_0 = \frac{\$16,000}{(1 + 0.05)^3} = \$13,821.40$$

Thus, the present value of \$16,000 discounted at 5% for 3 years is \$13,821.40.

Finally, the present value of the mixed stream of cash flows is the sum of the present values of the three cash flows:

$$PV = \$16,190.48 + \$11,791.38 + \$13,821.40 = \$41,803.26$$

The present value of the stream of cash flows is \$41,803.26.

<b>Year</b>	<b>Cash Flow Stream</b>
1	17,000
2	13,000
3	16,000
Present Value (\$) =	41,803.26



# MyFinanceLab Solutions Manual

You have \$700 in an account which pays 8.6% compounded annually. How many additional dollars of interest would you earn over 3 years if you moved the money to an account earning 9.2%?

Timeline diagram showing two scenarios for the future value of \$700 at time 3:

- Scenario 1:  $PV_0 = \$700$  at time 0,  $i = 8.6\%$ ,  $FV_3 = ?$  at time 3.
- Scenario 2:  $PV_0 = \$700$  at time 0,  $i = 9.2\%$ ,  $FV_3 = ?$  at time 3.

The generalized equation for finding the future value of a single cash flow is given as:

$$FV_n = PV_0 \times (1 + i)^n$$

$FV_n$  = the future value of a single cash flow at the end of the nth period  
 $PV_0$  = the present value  
 $i$  = the interest rate earned during each period  
 $n$  = the number of periods the cash flow is allowed to compound






$$FV_3 = \$700 \times (1 + 0.086)^3 = \$896.58$$

Alternatively, you can find the future value using a financial calculator or an Excel spreadsheet.

## Problem LO2.13 (cont.)

**Calculator solution:**

When solving for the future value of a single cash flow using a financial calculator, you will need to input the values of N, I/Y, PMT, and PV. Make sure you enter a zero for PMT, which is not used in the problem. Remember that either FV or PV must be entered as a negative number. Since compounding is annual, the periods per year setting on your calculator should be set at 1,  $P/Y = 1$ .

3	8.6	- 700	0	
				
				= \$896.58

**Spreadsheet solution:**

When solving for the future value of a single cash flow using an Excel spreadsheet, you will need to write the future value equation and Excel will perform the calculation.

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#### MyFinanceLab Solutions Manual

#### Problem LO2.13 (cont.)

	A	B
1		
2		
3	Problem Data:	
4	PV =	\$700
5	n =	3
6	i =	0.086
7		
8	Solution:	
9	FV =	$PV \times (1+i)^n$
10	FV =	\$896.58
11		
Entry in Cell B10 is = B4*(1+B6)^B5.		

If you save the money in the account that pays 9.2%, the future value of the initial deposit at the end of year 3 can be computed by substituting  $PV_0 = \$700$ ,  $i = 0.092$ , and  $n = 3$  into the future value equation:

$$FV_3 = \$700 \times (1 + 0.092)^3 = \$911.52$$

Thus, the future value of \$700 deposited at 9.2% for 3 years is \$911.52.

#### Calculator solution:

Problem LO2.13 (cont.)

$$\begin{array}{ccccc}
 3 & 9.2 & -700 & 0 & \\
 \boxed{N} & \boxed{I/Y} & \boxed{PV} & \boxed{PMT} & \boxed{FV} \\
 & & & & = \$911.52
 \end{array}$$

Spreadsheet solution:

	A	B
1		
2		
3	Problem Data:	
4	PV =	\$700
5	n =	3
6	i =	0.092
7		
8	Solution:	
9	FV =	$PV*(1+i)^n$
10	FV =	\$911.52
11		
Entry in Cell B10 is = B4*(1+B6)^B5.		

Subtract the future value of the low interest account from the future value of the high interest account. Since the principals are the same, the difference is the extra interest earned in the higher interest account:

$$\text{Extra interest earned} = \$911.52 - \$896.58 = \$14.94$$

Thus, you would earn \$14.94 more interest if you invest your money in the account that pays 9.2%.

## Chapter 3

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#### Problem LO2.14

Today you invested \$52,000 in an investment that pays 12% and will mature in 8 years. Once the investment matures, you will reinvest your funds for another 12 years in another investment that pays 15%. What will be the value of your investment after 20 years?

---

This question is just about finding the future value over a period of time with changing interest rates. Remember that the value at the end of the first period becomes the principal for the second period. The generalized equation for finding the future value of a single cash flow is given as:

$$FV_n = PV_0 \times (1 + i)^n$$

where

$FV_n$  = the future value of a single cash flow at the end of the nth period

$PV_0$  = the present value

$i$  = the interest rate earned during each period

$n$  = the number of periods the cash flow is allowed to compound

Substituting  $PV_0 = \$52,000$ ,  $i = 0.12$ , and  $n = 8$  into the future value equation gives the amount at the end of year 8:

$$FV_8 = \$52,000 \times (1 + 0.12)^8 = \$128,750.09$$

Thus, if you invested \$52,000 today in an investment that pays 12% and will mature in 8 years, the value of your investment after 8 years will be \$128,750.09.

Alternatively, you can find the future value using a financial calculator or an Excel spreadsheet.

#### Calculator solution:

When solving for the future value of a single cash flow using a financial calculator, you will need to input the values of N, I/Y, PMT, and PV. Make sure you enter a zero for PMT, which is not used in the problem. Remember that either FV or PV must be entered as a negative number. Since compounding is annual, the periods per year setting on your calculator should be set at 1,  $P/Y = 1$ .

Problem LO2.14 (cont.)

$$\begin{array}{ccccc}
 8 & 12 & -52,000 & 0 & \\
 \boxed{N} & \boxed{I/Y} & \boxed{PV} & \boxed{PMT} & \boxed{FV} \\
 & & & & = \$128,750.09
 \end{array}$$

### Spreadsheet solution:

When solving for the future value of a single cash flow using an Excel spreadsheet, you will need to write the future value equation and Excel will perform the calculation.

	A	B
1		
2		
3	Problem Data:	
4	PV =	\$52,000
5	n =	8
6	i =	0.12
7		
8	Solution:	
9	FV =	$PV \cdot (1+i)^n$
10	FV =	\$128,750.09
11		
Entry in Cell B10 is = B4*(1+B6)^B5.		

Once the first investment matures, you will reinvest your funds for another 12 years in another investment that pays 15%. The value of your investment after 20 years can be computed as follows:

**Chapter 3**

Problem LO2.14 (cont.)

$$FV_{20} = \$128,750.09 \times (1 + 0.15)^{12} = \$688,845.18$$

**Calculator solution:**

12

N

15

I/Y

− 128,750.09

PV

0

PMT

FV

= \$688,845.18

**Spreadsheet solution:**

	A	B
1		
2		
3	Problem Data:	
4	PV =	\$128,750.09
5	n =	12
6	i =	0.15
7		
8	Solution:	
9	FV =	PV*(1+i)^n
10	FV =	\$688,845.18
11		
Entry in Cell B10 is = B4*(1+B6)^B5.		

## Problem LO2.15

Suppose that the NASDAQ Composite index hit a level of 2,120 in February of 2008. In February of 1995 it was at a level of 4,700. What was the annual average compound growth rate over the period?

The compound annual interest or growth rate can be found using the following equation:

$$i = [FV_n / PV_0]^{1/n} - 1$$

where

$FV_n$  = the future value of the NASDAQ index at the end of the  $n$ th period

$PV_0$  = the NASDAQ index level in 1995

$i$  = the annual growth rate of the NASDAQ index

$n$  = the number of periods the growth is allowed to compound

Substituting  $PV_0 = \$4,700$ ,  $FV_n = \$2,120$ , and  $n = 13$  into the mathematical equation gives the compound annual growth rate:

$$i = [2,120 / 4,700]^{1/13} - 1 = -0.05940 = -5.94\%$$

The annual average compound growth rate of the NASDAQ Composite index over the period from 1995 to 2008 was  $-5.94\%$ .

Alternatively, you can find the interest rate using a financial calculator or an Excel spreadsheet.

**Calculator solution:**

When solving for the interest rate of an investment using a financial calculator, you will need to input the values of N, PV, PMT, and FV. Make sure you enter a zero for PMT, which is not used in the problem. Since compounding is annual, the periods per year setting on your calculator should be set at 1,  $P/Y = 1$ . Most calculators require either the PV or the FV value to be input as a negative number to calculate an unknown interest or growth rate.



## Chapter 3

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#### Problem LO2.15 (cont.)

$$\begin{array}{ccccc} 13 & & -4,700 & & 0 & & 2,120 \\ \boxed{N} & & \boxed{PV} & & \boxed{PMT} & & \boxed{FV} \\ & & = -5.94\% & & & & \end{array}$$

#### Spreadsheet solution:

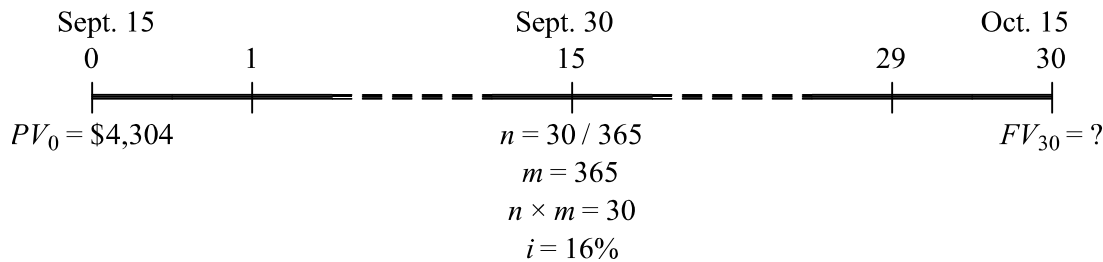
When solving for the interest rate of an investment using an Excel spreadsheet, you will need to write the interest rate equation and Excel will perform the calculation.

	A	B
1		
2		
3	Problem Data:	
4	PV =	\$4,700
5	FV =	\$2,120
6	n =	13
7	i =	?
8		
9	Solution:	
10	i =	$(FV/PV)^{(1/n)} - 1$
11	i =	
12		
Entry in Cell B11 is $= (B5/B4)^{(1/B6)} - 1$ .		

## Problem LO2.16

Your VISA bill for September has one item: a 72 inch Plasma television costing \$4,304 which was purchased on Sept 15th. It is now October 15th at midnight. You have missed the payment deadline and now owe interest. VISA calculates interest on the daily balance (with daily compounding) from the date of purchase. Assume that the purchase occurred at midnight, so the Sept 15th purchase accrues its first day of interest at the end of Sept 16th. The annual rate charged by VISA is 16%. If you pay off the debt (including interest) right now (at midnight on October 15th), then how much do you have to pay? (Assume a 365-day year.)

The amount owed is the future value of the purchase over thirty days with daily compounding. To see that the length of time is thirty days, draw a timeline and count the intervals from September 15th to October 15th. The timeline for the problem is:



In this example, the term is 30 out of 365 days, so  $n = 30/365$ . With daily compounding,  $m = 365$ .

The generalized equation for finding the future value of a single cash flow is given as:

$$FV_{n \times m} = PV_0 \times \left(1 + \frac{i}{m}\right)^{n \times m}$$

where

$FV_{n \times m}$  = the future value of a single cash flow at the end of the  $(n \times m)$ th period

$PV_0$  = the present value

$i$  = the annual interest rate

$n$  = the number of years

$m$  = the number of compounding periods in the year

$n \times m$  = the number of periods the cash flow is allowed to compound

## Chapter 3

### MyFinanceLab Solutions Manual

#### Problem LO2.16 (cont.)

Substituting  $PV_0 = \$4,304$ ,  $i = 0.160$ ,  $n = 30/365$ , and  $m = 365$  into the future value equation gives the amount at midnight on October 15th:

$$FV_{30} = \$4,304 \times \left(1 + \frac{0.160}{365}\right)^{30} = \$4,360.96$$

Thus, if you pay the account balance on October 15 you have to pay \$4,360.96.

Alternatively, you can find the future value using a financial calculator or an Excel spreadsheet.

#### Calculator solution:

When solving for the future value of a single cash flow using a financial calculator, you will need to input the values of N, I/Y, PMT, and PV. Make sure you enter a zero for PMT, which is not used in the problem. Remember that either FV or PV must be entered as a negative number. In this example, the term is 30 out of 365 days, so  $n = 30/365$ . With daily compounding,  $m = 365$ . Thus, the input for the total number of periods would be  $N = (30/365) \times 365 = 30$  and the daily interest rate would be  $I = 16\% \div 365 = 0.043836\%$ .

30	0.043836	- 4,304	0	
<b>N</b>	<b>I/Y</b>	<b>PV</b>	<b>PMT</b>	<b>FV</b>
				= \$4,360.96

#### Spreadsheet solution:

When solving for the future value of a single cash flow using an Excel spreadsheet, you will need to write the future value equation and Excel will perform the calculation.

## Problem LO2.16 (cont.)

	A	B
1		
2		
3	Problem Data:	
4	PV =	\$4,304
5	FV =	?
6	n =	0.08219
7	i =	0.160
8	m =	365
9	i/m =	0.00043836
10	n*m =	30
11		
12		
13	Solution:	
14	FV =	$PV * (1 + i/m)^{(n*m)}$
15	FV =	\$4,360.96
16		
Entry in Cell B15 is = B4*(1+B9)^B10.		

## Chapter 3

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### MyFinanceLab Solutions Manual

#### Problem LO2.17

You have a savings account that pays 7.0% interest compounded semiannually, but you are considering transferring your funds into a savings account that pays 6.5% interest compounded monthly. Calculate the difference in the effective interest rates of your current and potential new accounts. (Express the rates in decimal form. Subtract the EIR of the new account from the EIR of your existing account.)

---

The effective interest rate (EIR) is the amount you would need to earn with annual compounding to be as well off as you are with multiple compounding periods per year. The effective interest rate is given by:

$$\text{Effective interest rate} = \left(1 + \frac{i}{m}\right)^m - 1$$

where  $i$  = the annual interest rate (or quoted rate)

$m$  = the number of compounding periods in the year

Substituting  $i = 0.070$  and  $m = 2$  into the following equation gives the effective annual rate on the current account:

$$\text{Effective interest rate} = \left(1 + \frac{0.070}{2}\right)^2 - 1 = 0.0712$$

Thus, the effective interest rate of your current account is 0.0712 or 7.12%.

Substituting  $i = 0.065$  and  $m = 12$  into the following equation gives the effective annual rate on the new account:

$$\text{Effective interest rate} = \left(1 + \frac{0.065}{12}\right)^{12} - 1 = 0.0670$$

Thus, the effective interest rate of the potential new account is 0.0670 or 6.70%.

Subtract the EIR of the new account from the EIR of your existing account to find the difference in the effective interest rates:

$$\text{Difference} = 0.0712 - 0.0670 = 0.0042$$

Thus, the difference in the effective interest rates of your current and potential new accounts is 0.0042 or 0.42%.

## Problem LO2.18

The Piccadilly Savings and Loan offers a savings account with a quoted rate of 7% which is compounded 12 times per year. Not to be outdone, the Thames Embankment Bank wants to offer a competing account with daily compounding. What quoted rate does Thames have to offer in order to produce the same effective interest rate as offered by Piccadilly? Assume a 365-day year and express your answer in percentage form rounded to two decimal places. (e.g., 14.56%)

The solution is found by equating the effective interest rates for the two savings accounts. The effective interest rate of the Piccadilly account can be solved precisely. The unknown is the quoted rate for the Thames account. The effective interest rate is the amount you would need to earn with annual compounding to be as well off as you are with multiple compounding periods per year and is given by:

$$\text{Effective interest rate} = \left(1 + \frac{i}{m}\right)^m - 1$$

where  $i$  = the annual interest rate (or quoted rate)

$m$  = the number of compounding periods in the year

Substituting  $i = 0.07$  and  $m = 12$  into the following equation gives the effective annual rate of the Piccadilly account:

$$\text{Effective interest rate} = \left(1 + \frac{0.07}{12}\right)^{12} - 1 = 0.0723 = 7.23\%$$

Thus, the effective interest rate of the Piccadilly account is 0.0723 or 7.23%.

With daily compounding,  $m$  is equal to 365. Thus, the quoted rate that Thames has to offer in order to produce the same effective interest rate as offered by Piccadilly can be found by solving the following effective interest rate equation for the  $i$ :

$$0.0723 = \left(1 + \frac{i}{365}\right)^{365} - 1$$

$$\rightarrow i = [(0.0723 + 1)^{1/365} - 1] \times 365$$

$$\rightarrow i = 0.0698 = 6.98\%$$

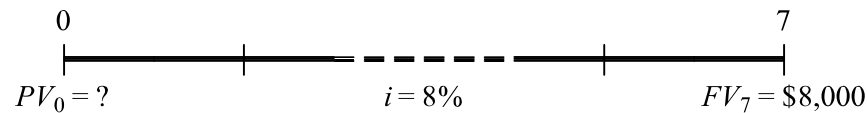
## Chapter 3

### MyFinanceLab Solutions Manual

#### Problem LO3.19

Andy promises to pay Opie \$8,000 when Opie graduates from Mayberry University in 7 years. How much must Andy deposit today to make good on his promise, if he can earn 8% on his investments?

The timeline for the problem is:



The generalized equation for finding the present value of a single cash flow is given as:

$$PV_0 = \frac{FV_n}{(1 + i)^n}$$

where

$PV_0$  = the present value

$FV_n$  = the future value of a single cash flow at the end of the nth period

$i$  = the annual interest rate

$n$  = the number of periods

Substituting  $FV_7 = \$8,000$ ,  $i = 0.08$ , and  $n = 7$  into the present value equation gives the amount at time 0:

$$PV_0 = \frac{\$8,000}{(1 + 0.08)^7} = \$4,667.92$$

Thus, Andy must deposit \$4,667.92 today at 8% interest rate for 7 years to make good on his promise.

Alternatively, you can find the present value using a financial calculator or an Excel spreadsheet.

#### Calculator solution: