

Valuation of Securities

1. Calculate the price of a \$1,000 face value bond if the coupon rate is 12%, payable semiannually the time until maturity is 15 years, and the going interest rate is 10%.

- a. \$1,153.75
- b. \$1,225.50
- c. \$1,311.65
- d. \$1,550.35

2. Calculate the market price of a \$1,000 face value bond if the coupon rate is 7%, the time until maturity is 5 years, and the current market rate is 12%. Assume semiannual payments.

- a. \$850
- b. \$715
- c. \$805
- d. \$816

3. Calculate the price of a \$1,000 face value bond if the coupon rate is 14% payable semiannually, the time until maturity is 30 years, and the going market rate is 9%.

- a. \$1,515.96
- b. \$1,531.82
- c. \$1,549.96
- d. \$1,495.72

4. Longly Trucking is issuing a 20-year bond with a \$2,000 face value tomorrow. The issue is to pay an 8% coupon rate payable semiannually, because that was the interest rate while it was being planned. However interest rates have increased suddenly and are expected to be 9% when the bond is actually sold. What will Longly receive for each bond tomorrow?

- a. \$1,614.33
- b. \$1,815.93
- c. \$1,673.19
- d. \$1,801.13

5. Determine the value of a \$1,000 Canadian Pacific Limited perpetual 4% debenture (bond) at the 4% required rate of return.

- a. \$1,000
- b. \$1,004
- c. \$1,400
- d. \$1,040

6. Determine the value of a \$1,000 Canadian Pacific Limited perpetual 4% annual coupon rate debenture (bond) at the 6% annual required rate of return.

- a. \$1,400
- b. \$967.67
- c. \$666.67
- d. \$860

7. Determine the value of a share of Litton Industries Series B \$2.00 cumulative preferred stock to an investor who requires a 9% annual rate of return.

- a. \$20.20
- b. \$22.22
- c. \$19.72
- d. \$21.09

8. Determine the value of a share of Litton Industries Series B \$2.00 cumulative preferred stock to an investor who requires a 12% annual rate of return.

- a. \$17.27
- b. \$16.97
- c. \$17.87
- d. \$16.67

9. Determine the value of a share of Baltimore Gas and Electric 4.5% cumulative preferred stock, series B, par value \$100 to an investor who requires a 9% annual rate of return on this security. The issue is callable at \$110 per share plus accrued dividends. However, the issue is not expected to be called at any time in the foreseeable future.

- a. \$45
- b. \$49
- c. \$50
- d. \$55

10. Assume that an investor purchased a \$1,000 par value bond with an annual coupon of \$50 on January 15, 1975. At the time of purchase, the bond's YTM was 9% and its term-to-maturity was 30 years. If the YTM remained constant until maturity, what was the bond's market price on January 15, 1975?

- a. \$588.70
- b. \$598.50
- c. \$608.80
- d. \$575.30

11. Assume that an investor purchased a \$1,000 par value bond with an annual coupon of \$50 on January 15, 1975. At the time of purchase, the bond's YTM was 9% and its term-to-maturity was 30 years. If the YTM remained constant until maturity, what was the bond's market price on January 15, 1985?

- a. \$629.15
- b. \$912.90
- c. \$634.45
- d. \$643.25

12. Assume that an investor purchased a \$1,000 par value bond with an annual coupon of \$50 on January 15, 1975. At the time of purchase, the bond's YTM was 9% and its term-to-maturity was 30 years. If the YTM remains constant until maturity, what will be the bond's market price on January 15, 2005?

- a. \$950
- b. \$1,050
- c. \$990
- d. \$1,000

13. Baker-Midland Corporation's bonds are selling for \$511.65 with a YTM of 13%. If they have a par value of \$1,000 and a term-to-maturity of 10 years, what is the annual coupon rate of Baker's bonds?

- a. 3.7%
- b. 4.0%
- c. 4.2%
- d. 3.9%

14. The stock of Sedly Inc. is expected to pay the following dividends:

Year-end	1	2	3	4
Dividends	\$2.25	\$3.50	\$1.75	\$2.00

At the end of the fourth year its stock value is expected to be \$37.50. What should Sedly sell for today if the annual return on stocks of similar risk is 12%?

- a. \$25.10
- b. \$27.90
- c. \$30.85
- d. \$31.15

15. Fred Tibbits has made a detailed study of the denim clothing industry. He's particularly interested in a company called Denhart Fashions that makes stylish denim apparel for children and teenagers. Fred has done a forecast of Denhart's earnings and looked at its dividend payment record. He's come to the conclusion that the firm will pay a dividend of \$5.00 for the next two years followed the next year with a dividend of \$6.50. Fred's investment plan is to buy Denhart now, hold it for three years and then sell. He thinks the price will be about \$75 when he sells. What is the most Fred should be willing to pay for a share of Denhart today if he can earn 10% annually on investments of similar risk?

- a. \$69.92
- b. \$61.23
- c. \$64.13
- d. \$71.20

16. The Pancake Corporation recently paid a \$3 dividend, and it is expected to grow at 5% forever. Investors generally require an expected return of at least 9% annually before they'll buy stocks similar to Pancake. What is Pancake's intrinsic value?

- a. \$75.50
- b. \$79.45
- c. \$77.05
- d. \$78.75

17. Blackstone Corporation's \$7 preferred was issued five years ago. The risk-appropriate annual interest rate for the issue is currently 11%. What is this preferred stock selling for today?

- a. \$56.34
- b. \$72.44
- c. \$63.64
- d. \$59.24

18. The Foreman Company's earnings and common stock dividends have been growing at an annual rate of 6% over the past 10 years and are expected to continue growing at this rate for the foreseeable future. The firm currently (that is, as of year 0) pays an annual dividend of \$5 per share. Determine the current value to investors of a share of Foreman common stock at a 14% annually required rate of return.

- a. \$65.50
- b. \$66.25
- c. \$64.85
- d. \$65.85

19. The Foreman Company's earnings and common stock dividends have been growing at an annual rate of 6% over the past 10 years and are expected to continue growing at this rate for the foreseeable future. The firm currently (that is, as of year 0) pays an annual dividend of \$5 per share. Determine the current value to investors of a share of Foreman common stock at a 6% annual required rate of return.

- a. \$65.50
- b. \$64.85
- c. \$65.85
- d. undefined

20. What is the current per-share value of JRM Corporation to an investor who requires a 16% annual rate of return, if JRM's current per-share dividend is \$2 and is expected to remain at \$2 for the foreseeable future?

- a. \$12.50
- b. \$20.00
- c. \$16.50
- d. \$14.50

21. Canadian National Railway sold 10 million shares of stock to the public at \$30 per share. The company received net proceeds from its underwriters of \$287,506,114. What was the underwriting spread from this stock offering?

- a. \$11,583,115
- b. \$12,493,886
- c. \$12,453,668
- d. \$13,250,376

22. Allied Milling's preferred stock pays \$7.00 per year. What is the value of one share of Allied preferred stock if the annual required rate of return is 12%, and what is the yield on Allied Preferred if the market price is \$50.00 per share?

- a. \$55.23; 13.6%
- b. \$57.34; 14%
- c. \$58.33; 14%
- d. \$59.21; 12.9%

23. Mid-South Power is planning to raise \$200 million for a new power plant. Its investment bank recommends that the firm issue preferred stock with a \$7.00 dividend.

a. If the firm estimated that the market's annual required rate of return would be 7% at the time of issuance, how many shares should Mid-South plan to offer for sale?

b. Assume that the issue price of the preferred stock reflected an annual market required rate of return of 6.75%. Based on your answer to part (a), what were the actual proceeds of the stock issue?

- a. 2,000,000 shares; \$205,500,000
- b. 2,000,000 shares; \$207,400,000
- c. 1,500,000 shares; \$240,700,000
- d. 2,000,000 shares; \$203,700,00

24. Hall Management Corporation has a 40% dividend payout ratio. The firm just paid a \$3.50 dividend on its shares of common stock. The dividend is expected to grow at 8% per year indefinitely. The market's annual required rate of return is 14%. What is Hall's current annual price-earnings (P/E) ratio?

- a. 6.37
- b. 5.87
- c. 7.07
- d. 7.20

THE PROBLEM BANK - SOLUTIONS

Part 2 - Valuation of Securities

Section 1 - Basic

1. Calculate the price of a \$1,000 face value bond if the coupon rate is 12%, payable semiannually the time until maturity is 15 years, and the going interest rate is 10%.

- a. **\$1,153.75**
- b. \$1,225.50
- c. \$1,311.65
- d. \$1,550.35

ANSWER: a

SOLUTION:

$$\begin{aligned}V_B &= \text{PMT} [\text{PVIFA}_{i,n}] + \text{FV} [\text{PVIF}_{i,n}] \\V_B &= \$60 [\text{PVIFA}_{5\%,30}] + \$1,000 [\text{PVIF}_{5\%,30}] \\&= \$60 (15.3725) + \$1,000 (.2314) \\&= \$1,153.75\end{aligned}$$

KEYSTROKES:

HP

1,000 [FV]

30 [N]

5 [I/YR]

[PV]

60 [PMT]

[PV]

Solution: -1,153.72

TI

1,000 [FV]

30 [N]

5 [I/Y]

[PV]

60 [PMT]

[CPT] [PV]

Solution: -1,153.72

2. Calculate the price of a \$1,000 face value bond if the coupon rate is 7% payable semiannually, the time until maturity is 5 years, and the going interest rate is 12%.

- a. \$850
- b. \$715
- c. \$805
- d. **\$816**

ANSWER: d

SOLUTION:

$$\begin{aligned}V_B &= \text{PMT} [\text{PVIFA}_{i,n}] + \text{FV} [\text{PVIF}_{i,n}] \\V_B &= \$35 [\text{PVIFA}_{6\%,10}] + \$1,000 [\text{PVIF}_{6\%,10}] \\&= \$35 (7.3601) + \$1,000 (.5584) \\&= \$816.00\end{aligned}$$

3. Calculate the price of a \$1,000 face value bond if the coupon rate is 14% payable semiannually, the time until maturity is 30 years, and the going market rate is 9%.

- a. **\$1,515.96**
- b. \$1,531.82
- c. \$1,549.96
- d. \$1,495.72

ANSWER: **a**

SOLUTION:

$$\begin{aligned}V_B &= \text{PMT} [\text{PVIFA}_{i,n}] + \text{FV} [\text{PVIF}_{i,n}] \\V_B &= \$70 [\text{PVIFA}_{4.5\%,60}] + \$1,000 [\text{PVIF}_{4.5\%,60}] \\&= \$70 (20.638) + \$1,000 (.0713) \\&= \$1,515.96\end{aligned}$$

4. Longly Trucking is issuing a 20-year bond with a \$2,000 face value tomorrow. The issue is to pay an 8% coupon rate payable semiannually, because that was the interest rate while it was being planned. However interest rates have increased suddenly and are expected to be 9% when the bond is actually sold. What will Longly receive for each bond tomorrow?

- a. \$1,614.33
- b. **\$1,815.93**
- c. \$1,673.19
- d. \$1,801.13

ANSWER: **b**

SOLUTION:

$$\begin{aligned}V_B &= \text{PMT} [\text{PVIFA}_{i,n}] + \text{FV} [\text{PVIF}_{i,n}] \\V_B &= \$80 [\text{PVIFA}_{4.5\%,40}] + \$2,000 [\text{PVIF}_{4.5\%,40}] \\&= \$80 (18.4016) + \$2,000 (.1719) \\&= \$1,815.93\end{aligned}$$

5. Determine the value of a \$1,000 Canadian Pacific Limited perpetual 4% debenture (bond) at the 4% required rate of return.

- a. **\$1,000**
- b. \$1,004
- c. \$1,400
- d. \$1,040

ANSWER: **a**

SOLUTION:

$$\begin{aligned}V_{B\text{-perpetual}} &= I/k_d \\I &= \$1,000 \times .04 = \$40 \\k_d &= 0.04 \\V_{B\text{-perpetual}} &= \$40 / 0.04 = \$1,000\end{aligned}$$

6. Determine the value of a \$1,000 Canadian Pacific Limited perpetual 4% annual coupon rate debenture (bond) at the 6% annual required rate of return.

- a. \$1,400
- b. \$967.67
- c. **\$666.67**
- d. \$860

ANSWER: **c**

SOLUTION:

$$V_{B\text{-perpetual}} = I/k_d$$
$$I = 0.04 \times \$1,000$$
$$k_d = 0.06$$
$$V_{B\text{-perpetual}} = \$40 / 0.06 = \$666.67$$

7. Determine the value of a share of Litton Industries Series B \$2.00 cumulative preferred stock to an investor who requires a 9% annual rate of return.

- a. \$20.20
- b. **\$22.22**
- c. \$19.72
- d. \$21.09

ANSWER: **b**

SOLUTION:

$$V_p = D_p/k_p$$
$$D_p = \$2 \quad k_p = 0.09$$
$$V_p = \$2 / 0.09 = \$22.22$$

KEYSTROKES:

HP

2 [\div]
.09 [=]

Solution: 22.22

TI

2 [\div]
.09 [=]

Solution: 22.22

8. Determine the value of a share of Litton Industries Series B \$2.00 cumulative preferred stock to an investor who requires a 12% annual rate of return.

- a. \$17.27
- b. \$16.97
- c. \$17.87
- d. **\$16.67**

ANSWER: **d**

SOLUTION:

$$V_p = D_p/k_p$$
$$D_p = \$2 \quad k_p = 0.12$$
$$V_p = \$2 / 0.12 = \$16.67$$

9. Determine the value of a share of Baltimore Gas and Electric 4.5% cumulative preferred stock, series B, par value \$100 to an investor who requires a 9% annual rate of return on this security. The issue is callable at \$110 per share plus accrued dividends. However, the issue is not expected to be called at any time in the foreseeable future.

- a. \$45
- b. \$49
- c. **\$50**
- d. \$55

ANSWER: **c**

SOLUTION:

$$V_p = D_p/k_p$$
$$D_p = 0.045 \times \$100 = \$4.50; \quad k_p = 0.09$$
$$V_p = \$4.50 / 0.09 = \$50$$

10. Assume that an investor purchased a \$1,000 par value bond with an annual coupon of \$50 on January 15, 1975. At the time of purchase, the bond's YTM was 9% and its term-to-maturity was 30 years. If the YTM remained constant until maturity, what was the bond's market price on January 15, 1975?

- a. **\$588.70**
- b. \$598.50
- c. \$608.80
- d. \$575.30

ANSWER: **a**

SOLUTION:

$$V_B = \text{Value of bond}$$
$$V_B = (\$50) (PVIFA_{9\%,30}) + (\$1000) (PVIF_{9\%,30})$$
$$= (\$50) (10.274) + (\$1,000) (0.075) = \$588.70$$

11. Assume that an investor purchased a \$1,000 par value bond with an annual coupon of \$50 on January 15, 1975. At the time of purchase, the bond's YTM was 9% and its term-to-maturity was 30 years. If the YTM remained constant until maturity, what was the bond's market price on January 15, 1985?

- a. \$629.15
- b. \$912.90
- c. **\$634.45**
- d. \$643.25

ANSWER: **c**

SOLUTION:

$$V_B = (\$50) (PVIFA_{9\%,20}) + (\$1000) (PVIF_{9\%,20})$$

$$= (\$50) (9.129) + (\$1000) (0.178) = \$634.45$$

12. Assume that an investor purchased a \$1,000 par value bond with an annual coupon of \$50 on January 15, 1975. At the time of purchase, the bond's YTM was 9% and its term-to-maturity was 30 years. If the YTM remains constant until maturity, what will be the bond's market price on January 15, 2005?

- a. \$950
- b. \$1,050
- c. \$990
- d. **\$1,000**

ANSWER: **d****SOLUTION:**

$$V_B = (\$50) (PVIFA_{9\%,0}) + (\$1000) (PVIF_{9\%,0})$$

$$= (\$50) (0) + (\$1000) (1,000) = \$1,000$$

13. Baker-Midland Corporation's bonds are selling for \$511.65 with a YTM of 13%. If they have a par value of \$1,000 and a term-to-maturity of 10 years, what is the annual coupon rate of Baker's bonds?

- a. 3.7%
- b. **4.0%**
- c. 4.2%
- d. 3.9%

ANSWER: **b****SOLUTION:**

$$V_B = (\text{Interest}) (PVIFA_{i,n}) + (\text{Par}) (PVIF_{i,n})$$

$$\$511.65 = (\text{Interest}) (PVIFA_{13\%,10}) + (\$1,000) (PVIF_{13\%,10})$$

$$\$511.65 = (\text{Interest}) (5.426) + (\$1,000) (0.295)$$

$$\text{Interest} = (\$511.65 - 295.00) / 5.426 = \$40$$

$$\text{Coupon} = \$40 / \$1,000 = 4.00\%$$

KEYSTROKES:**HP**

511.65 [-/+] [PV]
 1000 [FV]
 10 [N]
 13 [I/YR]
 [PMT]
Partial solution: 40.00
 [÷] 1000 [=]
Solution: 4%

TI

511.65 [-/+] [PV]
 1000 [FV]
 10 [N]
 13 [I/Y]
 [CPT] [PMT]
Partial solution: 40.00
 [÷] 1000 [=]
Solution: 4%

14. The stock of Sedly Inc. is expected to pay the following dividends:

Year-end	1	2	3	4
Dividends	\$2.25	\$3.50	\$1.75	\$2.00

At the end of the fourth year its stock value is expected to be \$37.50. What should Sedly sell for today if the annual return on stocks of similar risk is 12%?

- a. \$25.10
- b. \$27.90
- c. \$30.85
- d. **\$31.15**

ANSWER: **d**

SOLUTION:

Cash Flow	PVIF _{12%,n}	PV
\$2.25	.8929	\$2.01
\$3.50	.7972	\$2.79
\$1.75	.7118	\$1.25
\$39.50	.6355	<u>\$25.10</u>
		\$31.15

15. Fred Tibbits has made a detailed study of the denim clothing industry. He's particularly interested in a company called Denhart Fashions that makes stylish denim apparel for children and teenagers. Fred has done a forecast of Denhart's earnings and looked at its dividend payment record. He's come to the conclusion that the firm will pay a dividend of \$5.00 for the next two years followed the next year with a dividend of \$6.50. Fred's investment plan is to buy Denhart now, hold it for three years and then sell. He thinks the price will be about \$75 when he sells. What is the most Fred should be willing to pay for a share of Denhart today if he can earn 10% annually on investments of similar risk?

- a. **\$69.92**
- b. \$61.23
- c. \$64.13
- d. \$71.20

ANSWER: **a**

SOLUTION:

Cash Flow	PVIF _{14%,n}	PV
\$5.00	.9091	\$4.56
\$5.00	.8264	\$4.13
\$81.50	.7513	<u>\$61.23</u>
		\$69.92

16. The Pancake Corporation recently paid a \$3 dividend, and it is expected to grow at 5% forever. Investors generally require an expected return of at least 9% annually before they'll buy stocks similar to Pancake. What is Pancake's intrinsic value?

- a. \$75.50
- b. \$79.45
- c. \$77.05
- d. **\$78.75**

ANSWER: **d**

SOLUTION:

$$P_0 = \frac{D_0(1+g)}{k_s - g} = \frac{\$3.00(1.05)}{.09 - 0.05} = \$78.75$$

17. Blackstone Corporation's \$7 preferred was issued five years ago. The risk-appropriate annual interest rate for the issue is currently 11%. What is this preferred stock selling for today?

- a. \$56.34
- b. \$72.44
- c. **\$63.64**
- d. \$59.24

ANSWER: **c**

SOLUTION:

$$P_p = \frac{D_p}{k} = \frac{\$7}{.11} = \$63.64$$

KEYSTROKES:

HP

7 [\div]
.11 [=]

Solution: 63.64

TI

7 [\div]
.11 [=]

Solution: 63.64

18. The Foreman Company's earnings and common stock dividends have been growing at an annual rate of 6% over the past 10 years and are expected to continue growing at this rate for the foreseeable future. The firm currently (that is, as of year 0) pays an annual dividend of \$5 per share. Determine the current value to investors of a share of Foreman common stock at a 14% annually required rate of return.

- a. \$65.50
- b. **\$66.25**
- c. \$64.85
- d. \$65.85

ANSWER: **b**

SOLUTION:

$$P_0 = D_1 / (k_s - g)$$
$$g = 0.06; D_{01} = \$5.00; k_s = 0.14$$
$$P_0 = \$5.00 (1.06) / (0.14 - 0.06) = \$66.25$$

19. The Foreman Company's earnings and common stock dividends have been growing at an annual rate of 6% over the past 10 years and are expected to continue growing at this rate for the foreseeable future. The firm currently (that is, as of year 0) pays an annual dividend of \$5 per share. Determine the current value to investors of a share of Foreman common stock at a 6% annual required rate of return.

- a. \$65.50
- b. \$64.85
- c. \$65.85
- d. **undefined**

ANSWER: **d**

SOLUTION:

$$P_0 = D_1 / (k_e - g)$$
$$g = .06 \quad D_1 = \$5.30 \quad k_e = .06$$
$$P_0 = 5.30 / (.06 - .06) = \text{Undefined}$$

$k_e = g$, which violates assumption of constant-growth model.

20. What is the current per-share value of JRM Corporation to an investor who requires a 16% annual rate of return, if JRM's current per-share dividend is \$2 and is expected to remain at \$2 for the foreseeable future?

- a. **\$12.50**
- b. \$20.00
- c. \$16.50
- d. \$14.50

ANSWER: **a**

SOLUTION:

$$P_0 = D / k_s$$
$$= \$2.00 / 0.16$$
$$= \$12.50$$

21. Canadian National Railway sold 10 million shares of stock to the public at \$30 per share. The company received net proceeds from its underwriters of \$287,506,114. What was the underwriting spread from this stock offering?

- a. \$11,583,115
- b. **\$12,493,886**
- c. \$12,453,668
- d. \$13,250,376

ANSWER: **b**

SOLUTION:

$$\begin{aligned}\text{Underwriters, Receipts} &= \text{Selling price to the public} - \text{Proceeds to company} \\ &= (\$30 \times 10,000,000) - \$287,506,114 \\ &= \$12,493,886\end{aligned}$$

22. Allied Milling's preferred stock pays \$7.00 per year. What is the value of one share of Allied preferred stock if the annual required rate of return is 12%, and what is the yield on Allied Preferred if the market price is \$50.00 per share?

- a. \$55.23; 13.6%
- b. \$57.34; 14%
- c. **\$58.33; 14%**
- d. \$59.21; 12.9%

ANSWER: **c**

SOLUTION:

$$\begin{aligned}V_p &= D_p/k_p = \$7.00/0.12 = \$58.33 \\ k_p &= D_p/P_o = \$7.00/\$50 = 14\%\end{aligned}$$

23. Mid-South Power is planning to raise \$200 million for a new power plant. Its investment bank recommends that the firm issue preferred stock with a \$7.00 dividend.

a. If the firm estimated that the market's annual required rate of return would be 7% at the time of issuance, how many shares should Mid-South plan to offer for sale?
b. Assume that the issue price of the preferred stock reflected an annual market required rate of return of 6.75%. Based on your answer to part (a), what were the actual proceeds of the stock issue?

- a. 2,000,000 shares; \$205,500,000
- b. **2,000,000 shares; \$207,400,000**
- c. 1,500,000 shares; \$240,700,000
- d. 2,000,000 shares; \$203,700,00

ANSWER: **b**

SOLUTION:

$$\begin{aligned}\text{a. } V_p &= D_p/k_p = \$7.00/0.07 = \$100 \\ \text{Number of Shares Sold} &= \$200,000,000/\$100 = 2,000,000\end{aligned}$$

$$\begin{aligned}\text{b. } V_p &= D_p/k_p = \$7.00/0.0675 = \$103.70 \\ \text{Proceeds} &= \text{Number of Shares Sold} \times V_p \\ &= (2,000,000) (\$103.70) \\ &= \$207,400,000\end{aligned}$$

24. Hall Management Corporation has a 40% dividend payout ratio. The firm just paid a \$3.50 dividend on its shares of common stock. The dividend is expected to grow at 8% per year indefinitely. The market's annual required rate of return is 14%. What is Hall's current annual price-earnings (P/E) ratio?

- a. 6.37

- b. 5.87
- c. 7.07
- d. **7.20**

ANSWER: **d**

SOLUTION:

$$D_0 = \$3.50; k_s = 0.14; g = 0.08$$

$$D_1 = \$3.50 (1.08) = \$3.78$$

$$D_0 = 0.40 \times E_0$$

$$\$3.50 = 0.4E$$

$$\$8.75 = E$$

$$P_0 = (\$3.50 (1.08)) / (0.14 - 0.08) = \$3.78 / 0.06 = \$63$$

$$P/E = 63 / \$8.75 = 7.20$$

$$P_0 / E_0 = 7.20$$