SOLUTIONS TO PRACTICE PROBLEMS

Chapter 5:

USE THE FOLLOWING INFORMATION FOR THE NEXT TWO PROBLEMS

Companies	Number of shares outstanding	Closing Prices Day T	(per share) Day T + 1
1	2,000	$30.00	$25.00
2	7,000	55.00	60.00
3	5,000	20.00	25.00
4	4,000	40.00	45.00

(a) 23   Assume that a stock price-weighted indicator consisted of the four issues with their prices. What are the values of the stock indicator for Day T and T + 1 and what is the percentage change?
   a)   36.25, 38.75, 6.9%
   b)   38.75, 36.25, -6.9%
   c)   100, 106.9, 6.9%
   d)   107.48, 106.33, 1.15%
   e)   None of the above

Companies	Closing Prices Day T	(per share) Day T + 1
1	30.00	25.00
2	55.00	60.00
3	20.00	25.00
4	40.00	45.00
	145/4	155/4
	36.25	**38.75**

Therefore the index closed up **38.75/36.25 – 1 = 6.9%**

(c) 24   For a value-weighted series, assume that Day T is the base period and the base value is 100. What is the new index value for Day T + 1 and what is the percentage change in the index from Day T?

   a)   106.33, 6.33%
   b)   107.48, 7.48%
   c)   109.93, 9.93%
   d)   108.7, 8.7%
   e)   None of the above

Companies	Number of shares outstanding	Price Day T	Market value
1	2,000	30.00	60,000
2	7,000	55.00	385,000
3	5,000	20.00	100,000
4	4,000	40.00	160,000
			705,000

Base value equal to an index of 100

Companies	Number of shares outstanding	Price Day T + 1	Market value
1	2,000	25.00	70,000
2	7,000	60.00	420,000
3	5,000	25.00	125,000
4	4,000	45.00	180,000
			775,000

$$\text{Index} = \frac{775,000}{705,000} \text{ x } 100 = 109.93$$

Therefore the index closed up 9.93%

USE THE FOLLOWING INFORMATION FOR THE NEXT FIVE PROBLEMS

	Stock Price			# Shares		
	X	**Y**	**Z**	**X**	**Y**	**Z**
Jan. 13, 2005	20	40	30	1000	2000	1000*
Jan. 14, 2005	25	42	18	1000	2000	2000
Jan. 15, 2005	27	45	8	1000**	2000	2000
Jan. 16, 2005	20	40	10	3000	2000	2000

*2:1 Split on Stock Z after Close on Jan. 13, 2005
**3:1 Split on Stock X after Close on Jan. 15, 2005
The base date for index calculations is January 13, 2005

(b) 25   Calculate a price weighted average for January 13th.
   a)   32
   b)   30
   c)   36.13
   d)   34
   e)   None of the above

January 13 index = (20 + 40 + 30) ÷ 3 = 30

(b) 26   What is the divisor at the beginning of January 14th?
   a)   3.0
   b)   2.5
   c)   2.2734
   d)   1.9375
   e)   None of the above

January 14 adjusted divisor = (20 + 40 + 15) ÷ X = 30
X = 2.5

(d) 27   Calculate a price weighted average for January 16th.
    a)   30
    b)   32
    c)   34
    d)   36.13
    e)   None of the above

Step 1: January 15 index $= (27 + 45 + 8) \div 2.5 = 32$

Step 2: January 16 divisor $= (9 + 45 + 8) \div X = 32$
    $X = 1.9375$

Step 3: January 16 index $= (20 + 40 + 10) \div 1.9375 = 36.13$

(b) 28   Calculate a value weighted index for Jan. 13th if the initial index value is 100.
    a)   111.54
    b)   100
    c)   102.31
    d)   123.07
    e)   None of the above

January 13 index $= 100$ by definition

(a) 29   Calculate a value weighted index for January 15th if the initial index value is 100.
    a)   102.31
    b)   100
    c)   123.07
    d)   111.54
    e)   None of the above

Base Value (January 13) $= (20)(1000) + (40)(2000) + (30)(1000) = \$130,000$

January 15 Value $= (27)(1000) + (45)(2000) + (8)(2000) = 133,000$

Index $= (133,000 \div 130,000) \times 100 = 102.3077$

Chapter 7:

USE THE FOLLOWING INFORMATION FOR THE NEXT TWO PROBLEMS

Asset (A)	Asset (B)
$E(R_A) = 7\%$	$E(R_B) = 9\%$
$(\sigma_A) = 6\%$	$(\sigma_B) = 5\%$
$W_A = 0.6$	$W_B = 0.4$

$COV_{A,B} = 0.0014$

(d) 30   What is the expected return of a portfolio of two risky assets if the expected return $E(R_i)$,
standard deviation (σ_i), covariance $(COV_{i,j})$, and asset weight (W_i) are as shown above?
    a)   5.8%
    b)   6.1%
    c)   6.9%

d)   7.8%
e)   8.9%

$E(R_p) = W_A E(R_A) + W_B E(R_B)$
$= (0.6)(7) + (0.4)(9) = \mathbf{7.8\%}$

(a) 31   What is the standard deviation of this portfolio?
a)   4.87%
b)   3.62%
c)   4.13%
d)   5.76%
e)   6.02%

$\sigma_p = [(W_A)^2 (\sigma_A)^2 + (W_B)^2(\sigma_B)^2 + (2)(W_A)(W_B)(COV_{A,B})]^{1/2}$
$= [(0.6)^2(0.06)^2 (0.4)^2(0.05)^2 + (2)(0.6)(0.4)(0.0014)]^{1/2}$
$= (0.002368)^{1/2} = \mathbf{4.87\%}$

USE THE FOLLOWING INFORMATION FOR THE NEXT TWO PROBLEMS

Asset (A)	Asset (B)
$E(R_A) = 10\%$	$E(R_B) = 14\%$
$(\sigma_A) = 7\%$	$(\sigma_B) = 8\%$
$W_A = 0.7$	$W_B = 0.3$

$COV_{A,B} = 0.0013$

(e) 32   What is the expected return of a portfolio of two risky assets if the expected return $E(R_i)$, standard deviation (σ_i), covariance $(COV_{i,j})$, and asset weight (W_i) are as shown above?
a)   6.4%
b)   9.1%
c)   10.2%
d)   10.8%
e)   11.2%

$E(R_p) = W_A E(R_A) + W_B E(R_B)$
$= (0.7)(10) + (0.3)(14) = \mathbf{11.2\%}$

(b) 33   What is the standard deviation of this portfolio?
a)   4.51%
b)   5.94%
c)   6.75%
d)   7.09%
e)   8.62%

$\sigma_p = [(W_A)^2 (\sigma_A)^2 + (W_B)^2 (\sigma_B)^2 + (2)(W_A)(W_B)(COV_{A,B})]^{1/2}$
$= [(0.7)^2(0.07)^2 (0.3)^2(0.08)^2 + (2)(0.7)(0.3)(0.0013)]^{1/2}$
$= (0.003523)^{1/2} = \mathbf{5.94\%}$

34 Use the following information to answer the following questions:

Asset (A)	Asset (B)
$E(R_A) = 16\%$	$E(R_B) = 9\%$
$(\sigma_A) = 14\%$	$(\sigma_B) = 8\%$
$W_A = ?$	$W_B = ?$

Correlation coefficient $\gamma(A, B) = -0.20$

a. If 30 percent of fund is invested in stock A, what would the portfolio's standard deviation be?

$$E(\sigma_{port}^2) = w_1^2 \sigma_1^2 + w_2^2 \sigma_2^2 + 2 w_1 w_2 r_{1,2} \sigma_1 \sigma_2$$

Substituting the numbers into the formula above:

Portfolio variance $= E(\sigma^2) = 0.00396$; Standard deviation $= \sigma = 0.0629 = 6.29\%$

b. Assume that W_A and W_B are not known and that your risk tolerance measured by portfolio standard deviation is 11%. What percentage of fund should be invested in stock A? How much in stock B?

c. Assume that W_A and W_B are not known and that you want to minimize the portfolio risk measured by portfolio standard deviation. What percentage of fund should be invested in stock A? How much in stock B?

Chapter 8:

(d) 35 Calculate the expected return for E Services which has a beta of 1.5 when the risk free rate is 0.05 and you expect the market return to be 0.11.
   a)   10.6%
   b)   12.1%
   c)   13.6%
   d)   14.0%
   e)   16.2%

$k = 0.05 + 1.5 (0.11 - 0.05) = 0.1400 = \textbf{14.00\%}$

(c) 36 Calculate the expected return for F Inc. which has a beta of 1.3 when the risk free rate is 0.06 and you expect the market return to be 0.125.
   a)   12.65%
   b)   13.55%
   c)   14.45%
   d)   15.05%
   e)   16.34%

$$k = 0.06 + 1.3 (0.125 - 0.06) = 0.1445 = \mathbf{14.45\%}$$

(d) 37   Recently you have received a tip that the stock of Buttercup Industries is going to rise from $76.00 to $85.00 per share over the next year. You know that the annual return on the S&P 500 has been 13% and the 90-day T-bill rate has been yielding 3% per year over the past 10 years. If beta for Buttercup is 1.0, will you purchase the stock?
a)   Yes, because it is overvalued.
b)   Yes, because it is undervalued.
c)   No, because it is undervalued.
d)   No, because it is overvalued.
e)   Yes, because the expected return equals the estimated return.

Expected Return $= 3 + (1.0)(13 - 3) = \mathbf{13.0\%}$
Estimated Return $= (85 - 76) \div 76 = \mathbf{11.84\%}$

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Estimated Return < Expected Return
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$\therefore$ `Stock is overvalued and should not be purchased.`

USE THE FOLLOWING INFORMATION FOR THE NEXT THREE PROBLEMS

You expect the risk-free rate (RFR) to be 5 percent and the market return to be 9 percent. You also have the following information about three stocks.

STOCK	BETA	CURRENT PRICE	EXPECTED PRICE	EXPECTED DIVIDEND
X	1.50	$ 22	$ 23	$ 0.75
Y	0.50	$ 40	$ 43	$ 1.50
Z	2.00	$ 45	$ 49	$ 1.00

(b) 38   What are the required rates of return for the three stocks (in the order X, Y, Z)?
a)   16.50%, 5.50%, 22.00%
b)   11.00%, 7.00%, 13.00%
c)   7.95%, 11.25%, 11.11%
d)   6.20%, 2.20%, 8.20%
e)   15.00%, 3.50%, 7.30%

(a) 39   What are the estimated rates of return for the three stocks (in the order X, Y, Z)?
a)   7.95%, 11.25%, 11.11%
b)   6.20%, 2.20%, 8.20%
c)   16.50%, 5.50%, 22.00%
d)   11.00%, 7.00%, 13.00%
e)   15.00%, 3.50%, 7.30%

(e) 40   What is your investment strategy concerning the three stocks?
a)   Buy stock Y, it is undervalued.
b)   Buy stock X and Z, they are undervalued.
c)   Sell stocks X and Z, they are overvalued.
d)   Sell stock Y, it is overvalued.
e)   Choices a and c

STOCK	REQUIRED	ESTIMATED	EVALUATION

X	$.05 + 1.5(.09 - .05) = \mathbf{11.0\%}$	$\dfrac{23 - 22 + .75}{22} = 7.95\%$	overvalued
Y	$.05 + 0.5(.09 - .05) = \mathbf{7.0\%}$	$\dfrac{43 - 40 + 1.50}{40} = 11.25\%$	undervalued
Z	$.05 + 2.0(.09 - .05) = \mathbf{13.0\%}$	$\dfrac{49 - 45 + 1.00}{45} = 11.11\%$	overvalued

USE THE FOLLOWING INFORMATION FOR THE NEXT TWO PROBLEMS

The National Motor Company's last dividend was $1.25 and the directors expect to maintain the historic 4 percent annual rate of growth. You plan to purchase the stock today because you feel that the growth rate will increase to 7 percent for the next three years and the stock will then reach $25.00 per share.

(d) 41   How much should you be willing to pay for the stock if you require a 16 percent return?

     a) $17.34
     b) $18.90
     c) $19.09
     d) $19.21
     e)   None of the above

You believe $g = 7\%$:

$D1 = D0 (1+g) = 1.25 (1+.07) = 1.3375$
$D2 = D1 (1+g) = 1.3375 (1+.07) = 1.4311$
$D3 = D2 (1+g) = 1.4311 (1+.07) = 1.5313$
$P3 = 25$
P0 = sum of the present values of D1, D2, D3, and P3 = **$19.21 per share**

(c) 42   How much should you be willing to pay for the stock if you feel that the 7 percent growth rate can be maintained indefinitely and you require a 16 percent return?

     a) $11.15
     b) $14.44
     c) $14.86
     d) $18.90
     e) $19.24

Constant growth model:

P0 = D1/(r-g) = 1.3375/(.16-.07) = $14.86 per share