Chapter 5
Risk and Return: Past and Prologue

1. $V(12/31/2007) = V(1/1/1991) \times (1 + g)^7 = \$140{,}710.04$

2. i and ii. The standard deviation is non-negative.

4. $E(r) = 14\%$

   $\sigma^2 = 540$

   $\sigma = 23.24\%$

   The mean is unchanged, but the standard deviation has increased.

5.

   a. The holding period returns for the three scenarios are:

      Boom: 30.00%

      Normal: 10.00%

      Recession: –13.75%

      E(HPR) = 8.75%

   $\sigma^2(HPR) = 319.79$

   $\sigma = \sqrt{319.79} = 17.88\%$

   b. $E(r) = 6.375\%$

   $\sigma = 8.94\%$

6. Investment 3. For each portfolio: Utility = $E(r) - (0.5 \times 4 \times \sigma^2)$

Investment	E(r)	σ	U
1	0.12	0.30	-0.0600
2	0.15	0.50	-0.3500
3	0.21	0.16	0.1588
4	0.24	0.21	0.1518

We choose the portfolio with the highest utility value.

8. b

9. $E(r_X) = 20\%$

   $E(r_Y) = 10\%$

10. $\sigma_X^2 = 592$

    $\sigma_X = 24.33\%$

    $\sigma_Y = 175$

    $\sigma_Y = 13.23\%$

11. E(r) = 19%

12. The probability is 0.50 that the state of the economy is neutral. Given a neutral economy, the probability that the performance of the stock will be poor is 0.30, and the probability of both a neutral economy and poor stock performance is: 0.15

13. E(r) = 11.4%

14.

a. Time-weighted average returns are based on year-by-year rates of return.

Year	Return = [(capital gains + dividend)/price]
2005-2006	14.00%
2006-2007	–14.55%
2007-2008	10.00%

Arithmetic mean: 3.15%

Geometric mean: 2.33%

16. In the table below, we use data from Table 5.3 and the approximation: $r \cong R - i$:

Large Stocks:	$r \cong 9.06\%$
Small Stocks:	$r \cong 15.01\%$
Long-Term T-Bonds:	$r \cong 2.51\%$
T-Bills:	$r \cong 0.64\%$

Next, we compute real rates using the exact relationship:

$$r = \frac{1+R}{1+i} - 1 = \frac{R-i}{1+i}$$

Large Stocks:	r = 8.79%
Small Stocks:	r = 14.55%
Long-Term T-Bonds:	r = 2.43%
T-Bills	r = 0.62%

19.

a. Mean of portfolio = $(1 - y)rf + y\,rP = rf + (rP - rf)y = 7 + 10y$
If the expected rate of return for the portfolio is 15%, then, solving for y:

$$15 = 7 + 10y \Rightarrow y = \frac{15 - 7}{10} = 0.8$$

Therefore, in order to achieve an expected rate of return of 15%, the client must invest 80% of total funds in the risky portfolio and 20% in T-bills.

b.

Security	Investment Proportions
T-Bills	20.0%
Stock A	21.6%
Stock B	26.4%
Stock C	32.0%

c. σ_P = 21.6% per year