SOLUTIONS TO TEXT PROBLEMS:

Quick Quizzes

1. The present value of $150 to be received in 10 years if the interest rate is 7 percent is $\$150/(1.07)^{10} = \$76.25$.

2. There are three ways in which a risk-averse person may reduce the risk he faces: (1) purchase insurance, (2) diversify his portfolio, or (3) choose safer alternatives by accepting a lower rate of return.

3. No. According to the efficient markets hypothesis, the price of a share of stock should reflect all available information about its value. Thus, the stocks in this list should do no better on average than any other stock listed on the stock exchange.

Questions for Review

1. If the interest rate is 7 percent, the present value of $200 to be received in 10 years is $\$200/(1.07)^{10} = \$101.67$. If the interest rate is 7 percent, the present value of $300 to be received 20 years from now is $\$300/(1.07)^{20} = \$77.53$.

2. Purchasing insurance allows an individual to reduce the level of risk he faces. Two problems that impede the insurance industry from working correctly are adverse selection and moral hazard. Adverse selection occurs because a high-risk person is more likely to apply for insurance than a low-risk person is. Moral hazard occurs because people have less incentive to be careful about their risky behavior after they purchase insurance.

3. Diversification is the reduction of risk achieved by replacing a single risk with a large number of smaller unrelated risks. A stockholder will get more diversification going from 1 to 10 stocks than from 100 to 120 stocks.

4. Stocks have more risk because their value depends on the future value of the firm. Because of its higher risk, shareholders will demand a higher return. There is a positive relationship between risk and return.

5. A stock analyst will consider the future profitability of a firm when determining the value of the stock.

6. The efficient markets hypothesis suggests that stock prices reflect all available information. This means that we cannot use current information to predict future changes in stock prices. One piece of evidence that supports this theory is the fact that many index funds outperform mutual funds that are actively managed by a professional portfolio manager.

7. Economists who are skeptical of the efficient markets hypothesis believe that fluctuations in stock prices are partly psychological. People may in fact be willing to purchase a stock that is overvalued if they believe that someone will be willing to pay even more in the future. This means that the stock price may not be a rational valuation of the firm.

Problems and Applications

1. The future value of $24 invested for 400 years at an interest rate of 7 percent is $(1.07)^{400} \times \$24 = \$13{,}600{,}000{,}000{,}000 = \$13.6$ trillion.

2. a. The present value of $15 million to be received in four years at an interest rate of 11 percent is $15 million/$(1.11)^4$ = $9.88 million. Since the present value of the payoff is less than the cost, the project should not be undertaken.

   The present value of $15 million to be received in four years at an interest rate of 10 percent is $15 million/$(1.10)^4$ = $10.25 million. Since the present value of the payoff is greater than the cost, the project should be undertaken.

   The present value of $15 million to be received in four years at an interest rate of 9 percent is $15 million/$(1.09)^4$ = $10.63 million. Since the present value of the payoff is greater than the cost, the project should be undertaken.

   The present value of $15 million to be received in four years at an interest rate of 8 percent is $15 million/$(1.08)^4$ = $11.03 million. Since the present value of the payoff is greater than the cost, the project should be undertaken.

   b. The exact cutoff for the interest rate between profitability and nonprofitability is the interest rate that will equate the present value of receiving $15 million in four years with the current cost of the project ($10 million):
   $\$10 = 15/(1 + x)^4$
   $10(1 + x)^4 = 15$
   $(1 + x)^4 = 1.5$
   $1 + x = (1.5)^{0.25}$
   $1 + x = 1.1067$
   $x = 0.1067$

   Therefore, an interest rate of 10.67 percent would be the cutoff between profitability and nonprofitability.

3. a. A sick person is more likely to apply for health insurance than is a well person. This is adverse selection. Once a person has health insurance, he may be less likely to take good care of himself. This is moral hazard.

   b. A risky driver is more likely than a safe driver to apply for car insurance. This is adverse selection. Once a driver has insurance, he may drive more recklessly. This is adverse selection.

4. To reduce the risk associated with the portfolio, it is better to diversify. This means that the stocks should be of companies from different industries as well as located in different countries.

5. A stock that is very sensitive to economic conditions will have more risk associated with it. Thus, we would expect for that stock to pay a higher return. To get stockholders to be willing to accept the risk, the expected return must be larger than average.

6. Shareholders will likely demand a higher return due to the stock's idiosyncratic risk. Idiosyncratic risk is risk that affects only that particular stock. All stocks in the economy are subject to aggregate risk.

7. a. If a roommate is buying stocks in companies that everyone believes will experience big profits in the future, the price-earnings ratio is likely to be high. The price is high because it reflects everyone's expectations about the firm's future earnings. The largest disadvantage in buying these stocks is that they are currently overvalued and may not pay off in the future.

b. Firms with low price-earnings ratios will likely have lower future earnings. The reason why these stocks are cheap is that everyone has lower expectations about the future profitability of these firms. The largest disadvantage to buying this stock is that the market may be correct and the firm's stock may provide a low return.

8. a. Answers will vary, but may include things like information on new products under development or information concerning future government regulations that will affect the profitability of the firm.

   b. The fact that those who trade stocks based on inside information earn very high rates of return does not violate the efficient markets hypothesis. The efficient market hypothesis suggests that the price of a stock reflects all available information concerning the future profitability of the firm. Inside information is not readily available to the public and thus is not reflected in the stock's price.

   c. Insider trading is illegal because it gives some buyers or sellers an unfair advantage in the stock market.