Application Exercises

In Exercises 27–32, use the formula

$$A = \frac{P[(1+r)^t - 1]}{r} \quad \text{or} \quad A = \frac{P\left[\left(1+\frac{r}{n}\right)^{nt} - 1\right]}{\frac{r}{n}}.$$

Round to the nearest dollar.

27. To save money for a sabbatical to earn a master's degree, you deposit $2000 at the end of each year in an annuity that pays 7.5% compounded annually.
    a. How much will you have saved at the end of five years?
    b. Find the interest.
28. To save money for a sabbatical to earn a master's degree, you deposit $2500 at the end of each year in an annuity that pays 6.25% compounded annually.
    a. How much will you have saved at the end of five years?
    b. Find the interest.
29. At age 25, to save for retirement, you decide to deposit $50 at the end of each month in an IRA that pays 5.5% compounded monthly.
    a. How much will you have from the IRA when you retire at age 65?
    b. Find the interest.
30. At age 25, to save for retirement, you decide to deposit $75 at the end of each month in an IRA that pays 6.5% compounded monthly.
    a. How much will you have from the IRA when you retire at age 65?
    b. Find the interest.
31. To offer scholarship funds to children of employees, a company invests $10,000 at the end of every three months in an annuity that pays 10.5% compounded quarterly.
    a. How much will the company have in scholarship funds at the end of ten years?
    b. Find the interest.
32. To offer scholarship funds to children of employees, a company invests $15,000 at the end of every three months in an annuity that pays 9% compounded quarterly.
    a. How much will the company have in scholarship funds at the end of ten years?
    b. Find the interest.

In Exercises 33–36, use the formula

$$P = \frac{A\left(\frac{r}{n}\right)}{\left[\left(1+\frac{r}{n}\right)^{nt} - 1\right]}.$$

Round up to the nearest dollar.

33. You would like to have $3500 in four years for a special vacation following graduation by making deposits at the end of every six months in an annuity that pays 5% compounded semiannually.
    a. How much should you deposit at the end of every six months?
    b. How much of the $3500 comes from deposits and how much comes from interest?
34. You would like to have $4000 in four years for a special vacation following graduation by making deposits at the end of every six months in an annuity that pays 7% compounded semiannually.
    a. How much should you deposit at the end of every six months?
    b. How much of the $4000 comes from deposits and how much comes from interest?
35. How much should you deposit at the end of each month into an IRA that pays 8.5% compounded monthly to have $4 million when you retire in 45 years? How much of the $4 million comes from interest?
36. How much should you deposit at the end of each month into an IRA that pays 6.5% compounded monthly to have $2 million when you retire in 45 years? How much of the $2 million comes from interest?

• Writing in Mathematics

37. What is an annuity?
38. What is meant by the value of an annuity?
39. Write a problem involving the formula for regular payments needed to achieve a financial goal. The problem should be similar to Example 4 on page 472. However, the problem should be unique to your situation. Include something for which you would like to save, how much you need to save, and how long it will take to achieve your goal. Then solve the problem.
40. What is stock?
41. Describe how to find the percent ownership that a shareholder has in a company.
42. Describe the two ways that investors make money with stock.
43. What is a bond? Describe the difference between a stock and a bond.
44. Using a recent newspaper, copy the stock table for a company of your choice. Then explain the meaning of the numbers in the columns.
45. If an investor sees that the dividends for a stock have a lower annual rate than those for a no-risk bank account, should the stock be sold and the money placed in the bank account? Explain your answer.

Use the following investments to answer Exercises 46–49.

Investment 1: 1000 shares of IBM stock
Investment 2: A 5-year bond with a 22% interest rate issued by a small company that is testing and planning to sell delicious, nearly zero-calorie desserts
Investment 3: A 30-year U.S. treasury bond at a fixed 7% annual rate

46. Which of these investments has the greatest risk? Explain why.
47. Which of these investments has the least risk? Explain why.
48. Which of these investments has the possibility of the greatest return? Explain why.
49. If you could be given one of these investments as a gift, which one would you choose? Explain why.