

# TIME VALUE OF MONEY - EXERCISES AND PROBLEMS

## Future Value Calculations

- E 10.** Song receives a one-year note for \$6,000 that carries a 12 percent annual interest rate for the sale of a used car. Compute the maturity value under each of the following assumptions: (1) The interest is simple interest. (2) The interest is compounded semiannually. (3) The interest is compounded quarterly. (4) The interest is compounded monthly.

## Future Value Calculations

- E 11.** Find the future value of (1) a single payment of \$40,000 at 7 percent for ten years, (2) ten annual payments of \$4,000 at 7 percent, (3) a single payment of \$12,000 at 9 percent for seven years, and (4) seven annual payments of \$12,000 at 9 percent.

## Determining an Advance Payment

- E 12.** Denise Davis is contemplating paying five years' rent in advance. Her annual rent is \$12,600. Calculate the single sum that would have to be paid now for the advance rent if we assume compound interest of 8 percent.

## Present Value Calculations

- E 13.** Find the present value of (1) a single payment of \$12,000 at 6 percent for 12 years, (2) 12 annual payments of \$1,000 at 6 percent, (3) a single payment of \$2,500 at 9 percent for five years, and (4) five annual payments of \$2,500 at 9 percent.

## Present Value of a Lump-Sum Contract

- E 14.** A contract calls for a lump-sum payment of \$30,000. Find the present value of the contract, assuming that (1) the payment is due in five years, and the current interest rate is 9 percent; (2) the payment is due in ten years, and the current interest rate is 9 percent; (3) the payment is due in five years, and the current interest rate is 5 percent; and (4) the payment is due in ten years, and the current interest rate is 5 percent.

**LO4, LO5 Present Value of an Annuity Contract**

**E 15.** A contract calls for annual payments of \$2,400. Find the present value of the contract, assuming that (1) the number of payments is seven, and the current interest rate is 6 percent; (2) the number of payments is 14, and the current interest rate is 6 percent; (3) the number of payments is seven, and the current interest rate is 8 percent; and (4) the number of payments is 14, and the current interest rate is 8 percent.

**LO4, LO5 Valuing an Asset for the Purpose of Making a Purchasing Decision**

**E 16.** Charles Ogden owns a service station and has the opportunity to purchase a car wash machine for \$15,000. After carefully studying projected costs and revenues, Ogden estimates that the car wash machine will produce a net cash flow of \$2,600 annually and will last for eight years. He determines that an interest rate of 14 percent is adequate for his business. Calculate the present value of the machine to Ogden. Does the purchase appear to be a smart business decision?

**LO4, LO5 Deferred Payment**

**E 17.** Antwone Equipment Corporation sold a precision tool machine with computer controls to Trudeau Corporation for \$400,000 on January 2 and agreed to take payment nine months later on October 2. Assuming that the prevailing annual interest rate for such a transaction is 16 percent compounded quarterly, what is the actual sale (purchase) price of the machine tool?

**LO4, LO5 Investment of Idle Cash**

**E 18.** Playwright Publishing Company, a publisher of college textbooks, has just completed a successful fall selling season and has \$2,500,000 in cash to invest for nine months, beginning on January 1. The company places the cash in an account that is expected to pay 4 percent annual interest compounded quarterly. Interest is credited to the company's account each quarter. How much cash will the company have at the end of nine months?

**LO4, LO5 Accumulation of a Fund**

**E 19.** Semma Corporation borrows \$1,500,000 from an insurance company on a five-year note. Management agrees to set aside enough cash at the end of each year to accumulate the amount needed to pay off the note at maturity. Since the first contribution to the fund will be made in one year, four annual contributions are needed. Assuming that the fund will earn 10 percent compounded annually, how much will the annual contribution to the fund be? (Round to nearest dollar.)

**LO4, LO5 Negotiating the Sale of a Business**

**E 20.** Andrea Lima is attempting to sell her business to Alfonso Moreno. The company has assets of \$1,800,000, liabilities of \$1,600,000, and stockholders' equity of \$200,000. Both parties agree that the proper rate of return to expect is 12 percent; however, they differ on other assumptions. Lima believes that the business will generate at least \$200,000 per year of cash flows for 20 years. Moreno thinks that \$160,000 in cash flows per year is more reasonable and that only ten years in the future should be considered. Using Table 4 in the appendix on future value and present value tables, determine the range for negotiation by computing the present value of Lima's offer to sell and of Moreno's offer to buy.

## Applications of Time Value of Money

- P 5.** The management of Pzazz, Inc., took the following actions that went into effect on January 2, 20x7. Each action involved an application of the time value of money.
- Established in one payment of \$50,000 a contingency fund for the possible settlement of a lawsuit. The suit is expected to be settled in two years.
  - Asked for another fund to be established by a single payment to accumulate to \$150,000 in four years.
  - Approved the purchase of a parcel of land for future plant expansion. Payments are to start January 2, 20x8, at \$100,000 per year for five years.
  - Determined that a new building to be built on the property in **c** would cost \$800,000 and authorized five annual payments to be paid starting January 2, 20x8, into a fund for its construction.

### Required

- Assuming an annual interest rate of 8 percent and using Tables 1 to 4 in this chapter, answer the following questions:
    - In action **a**, how much will the fund total in two years?
    - In action **b**, how much will need to be deposited initially to accumulate the desired amount?
    - In action **c**, what is the purchase price (present value) of the land?
    - In action **d**, how much would the equal annual payments need to be to accumulate enough money to construct the building?
  - User Insight:** What is the fundamental reason time value of money analysis is a useful tool in making business decisions?
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