

## 2.3 Annuities Due

### Exercises

1. At the beginning of each year, 700 € are deposited in a bank at 8% compounded annually. What will the value be by the end of 10 years?
2. A person deposits 1,000 € at 6%
  - (a) compounded annually, at the beginning of each year;
  - (b) compounded semiannually, at the beginning of each half-year.

Calculate the future value.

3. A house is rented for 900 € per quarter, with each quarter's rent payable in advance. If money is worth 8%, compounded quarterly, and the rent is deposited in an account, what is the future value of the rent for one year?
4. How much must be deposited at the beginning of each year into an account that pays 8%, compounded annually, so that the account will contain 24,000 € at the end of 5 years?
5. What size payments must be deposited at the beginning of each 6-month period into an account that pays 7.8%, compounded semiannually, so that the account will have a future value of 120,000 € at the end of 15 years.
6. Grandparents plan to open an account on their grandchild's birthday and contribute each month until he goes to university. How much must they contribute at the beginning of each month into an investment that pays 12%, compounded monthly, if they want the account to have 180,000 € at the end of 18 years.
7. How many times should equal amounts be deposited at the beginning of each year to amount to 14 times the value of a periodic deposit if the interest rate is 5% compounded annually.

8. How many times should equal amounts be deposited at the beginning of each quarter to amount to 20 times the value of a periodic deposit if the interest rate is 8% compounded quarterly.
9. A person deposits equal amounts at the beginning of each half-year. At the end of 3 years, the annuity amounts to 8,480 €, and at the end of 6 years, it amounts to 23,500 €. Calculate the value of a periodic deposit and the annual interest rate if the interest is compounded semiannually.
10. A person deposits equal amounts at the beginning of each quarter. At the end of 2 years, the annuity amounts to 6,500 €, and at the end of 4 years, it amounts to 14,200 €. Calculate the value of a periodic deposit and the annual interest rate if the interest is compounded quarterly.
11. Find the present value of an annuity due that pays 50,000 € at the beginning of each year for the next 12 years if money is worth 5.92%, compounded annually.
12. What amount must be set aside now to generate payments of 25,000 € at the beginning of each 6-month period for the next 2.5 years if money is worth 6.2%, compounded semiannually?
13. A company wants to have 40,000 € at the beginning of each 6-month period for the next 4.5 years. If an annuity is set up for this purpose, how much must be invested now if the annuity earns 6.68%, compounded semiannually?
14. A man makes 3,000 € contributions at the beginning of each half-year to a retirement account for a period of 8 years. For the next 20 years, he makes no additional contributions and no withdrawals. If the account earns 7.5%, compounded semiannually, find the value of the account after the 28 years.