

## 2.2 Arithmetic and Geometric Progressions

### Exercises

1. A business had an annual production of 5,000 units in 2005. The owner planned to increase the production each year by 25 units.
  - (a) What is the planned annual production by the end of 2020?
  - (b) What is the total amount planned to be produced from the beginning of 2005 until the end of 2020?
  - (c) What amount is planned to be produced from the beginning of 2015 till the end of 2020?
2. It has been estimated that contributions in response to a fund-raising campaign will be 10,000 € in the first week and during the following weeks
  - (a) will decrease each week by 800 €;
  - (b) will decrease each week by 20%.Calculate the total amount of money raised during the first 10 weeks.
3. A certain industrial machinery generates a 7,000 € profit during the first year of its use and each of the following years the profit decreases by 10%. What is the total profit generated by the use of the machinery during 10 years?
4. The maintenance cost of a certain industrial machinery is 2,000 € during the first year, and each of the following years the cost increases by 15%. What is the total maintenance cost of the machinery for 10 years?
5. A saver deposits 10,000 € in a bank for 10 years. What is the future value if the bank pays 6.5% interest *compounded* annually (i.e., each year the interest is added to the principal)?
6. A client invests periodically for 20 years at the beginning of each year equal deposits of 1,000 € to a private retirement fund. What is the future value of the annuity after 20 years if the fund pays 6% interest compounded annually?

7. A business produced 126,250 meters of cloth in its fifth year and it produced 390,625 meters in its sixth year. How many years are needed to produce 648,375 meters of cloth if the production increased by a geometric progression.
8. Suppose you are offered a job with a relatively low starting salary but with a 1,500 € raise for each of the next 7 years. How much more than your starting salary would you be making in the eighth year?
9. A new firm loses 2,000 € in its first month, but its profit increases by 400 € in each succeeding month for the next year.
  - (a) What is the profit in the twelfth month?
  - (b) What is the profit for the year?
10. If you make 27,000 € and 1,800 raise each year, in how many years will your salary double?
11. A house that 20 years ago was worth 160,000 has increased in its value by 4% each year because of inflation. What is it worth today?
12. A machine is valued at 10,000 €. If the depreciation at the end of each year is 20% of its value at the beginning of the year, find its value at the end of 4 years.
13. Suppose a new business makes a 1,000 € profit in its first month and has its profit increase by 10% each month for the next 2 years.
  - (a) How much profit will the business earn in its twelfth month?
  - (b) How much profit will it earn in its first year?
14. If changing market conditions cause a company earning 8,000,000 € in 2009 to project a loss of 2% in its profit in each of the next 5 years, what profit does it project in 2014?