

## Exercises 1

## Sets

### Set, element, empty set, subset, intersection, union, complement

#### Objectives

- understand what a set, an element of a set, an empty set, a subset, an intersection, a union, a complement is.
- be able to perform basic set operations.

#### Problems

1.1 Look at the sets A, B, and C:

A = Set of all the cities of the world

B = Set of all the European cities

C = Set of all the coastal cities of the world

Find at least four elements of the following sets:

a)  $B \cap C$

b)  $B \setminus C$

c)  $C \setminus B$

d)  $A \setminus (B \cup C)$

1.2 Harshbarger/Reynolds\*: Chapter 0 (Algebraic Concepts), Section 0.1 (p. 2-9)  
(Scanned pages 2-55 and A1-A5 in file "Algebraic Concepts.pdf" on Moodle)

a) Theory (p. 2-6)

b) Exercises (p. 6-9)

\*Harshbarger, R.J. and Reynolds, J.J.: Mathematical Applications for the Management, Life, and Social Sciences; Houghton Mifflin Company, Boston / New York 2007, 8th edition, ISBN 978-0-618-73162-6

**Answers**

- 1.1    a)     $B \cap C = \{\text{Lisbon, Copenhagen, Barcelona, Naples, Stockholm, ...}\}$   
      b)     $B \setminus C = \{\text{London, Paris, Madrid, Berlin, Rome, ...}\}$   
      c)     $C \setminus B = \{\text{Tokyo, San Francisco, Sydney, Rio de Janeiro, ...}\}$   
      d)     $A \setminus (B \cup C) = \{\text{Chicago, Mexico City, Nairobi, Beijing, ...}\}$
- 1.2    see Harshbarger/Reynolds: Chapter 0, Algebraic Concepts  
      (Scanned pages 2-55 and A1-A5 in file “Algebraic Concepts.pdf” on Moodle)