

Exercises 2 Numbers

Number sets, intervals, absolute value

Objectives

- know the definition and elements of the set of real numbers, rational numbers, integers, natural numbers.
- know and understand what an open, half-open, closed interval is.
- know and understand what the absolute value of a real number is.
- be able to perform basic operations with real numbers.

Problems

2.1 Decide whether each statement is true or false:

- | | | |
|------------------------------------|--|---|
| a) $4 \in \mathbb{N}$ | b) $-\frac{14}{7} \in \mathbb{Z}$ | c) $\sqrt{2} \in \mathbb{Q}$ |
| d) $\sqrt{9} \in \mathbb{N}$ | e) $\sqrt{9} \in \mathbb{Q}$ | f) $\sqrt{9} \in \mathbb{R}$ |
| g) $1.67854 \in \mathbb{Q}$ | h) $1.678\overline{54} \in \mathbb{Q}$ | i) $\mathbb{N} \subset \mathbb{Z}$ |
| j) $\mathbb{Z} \subset \mathbb{Q}$ | k) $\mathbb{Q} \subset \mathbb{R}$ | l) $\mathbb{R} \setminus \mathbb{Z} = \mathbb{N}$ |

2.2 Determine the following sets:

- | | | |
|--|--|--|
| a) $\mathbb{Z} \setminus \mathbb{N}$ | b) $\mathbb{Z} \cup \mathbb{N}$ | c) $\mathbb{Z} \cap \mathbb{N}$ |
| d) $\mathbb{Q} \cap (\mathbb{R} \setminus \mathbb{Q})$ | e) $\mathbb{Q} \cup (\mathbb{R} \setminus \mathbb{Q})$ | f) $(\mathbb{Q} \setminus \mathbb{Z}) \cap \mathbb{N}$ |

2.3 Harshbarger/Reynolds*: Chapter 0 (Algebraic Concepts), Section 0.2 (p. 9-15)
(Scanned pages 2-55 and A1-A5 in file “Algebraic Concepts.pdf” on Moodle)

- a) Theory (p. 9-13)
- b) Exercises (p. 13-15)

*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

2.1	a)	true	b)	true	c)	false
	d)	true	e)	true	f)	true
	g)	true	h)	true	i)	true
	j)	true	k)	true	l)	false

f) $(\mathbb{Q} \setminus \mathbb{Z}) \cap \mathbb{N} = \{\}$

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