Calculus on R Week 2

Lect. dr. ANCA GRAD Popp Andros Zsolt

Homework 2

Exercise 1

Fill in the following table by using \checkmark when the set is closed, and X when it is not:

		(1 0 2)	IP\(0.1)	Z	Q	$\mathbb{R} \backslash \mathbb{Q}$	\mathbb{R}
(-1,2] $(-1,1)$ [$-1,1]$ $\mathbb{R}\setminus\{1\}$	{1,2,3}	1/(0,1)		X	Х	X
XX	VX	V	V	0			

Exercise 2

Fill in the following table by using ✓ when the is a neighbourhood of 1, and ✗ when it is not:

	RIQ	IN
$ \begin{array}{c ccccccccccccccccccccccccccccccccccc$	X	

Exercise 3

Which of the following sets either open or closed? Try to sketch some proofs.

Which of the following sold
$$A = \bigcup_{n \in \mathbb{N} \setminus \{1\}} \left(-1 + \frac{1}{n}, 1 - \frac{1}{n} \right), \quad B = \bigcup_{n \in \mathbb{N}} \left[-1 + \frac{1}{n}, 1 - \frac{1}{n} \right]$$

$$C = \bigcap_{n \in \mathbb{N} \setminus \{1\}} \left(-1 + \frac{1}{n}, 1 - \frac{1}{n} \right) \quad D = \bigcap_{n \in \mathbb{N}} \left[-1 + \frac{1}{n}, 1 - \frac{1}{n} \right]$$

$$E = \bigcup_{n \in \mathbb{N}} \left[-1 - \frac{1}{n}, 1 + \frac{1}{n} \right] \quad F = \bigcap_{n \in \mathbb{N}} \left(-1 - \frac{1}{n}, 1 + \frac{1}{n} \right)$$

$$A - \text{Open} \Rightarrow A = \left(-1 + O \right) \quad A \Rightarrow \begin{cases} -1 + O \\ 1 - O \end{cases} \quad A \Rightarrow \begin{cases} -1 + O \\$$

Excercise 4 Fill in the following table:

Nr.	A	int A	bd A	cl A	ext A	Izo A	A'
1	$(-\infty,-4]\cup(2,5)$	(-2,-4) U(2,5)	1-4,5}	(-,-9) U[2,5]	(-4,2) U[5,00)	Ø	cl 4
2	(-1,9]∪[10,∞)	(-1,3) U (10,0)	49,104	E1,9] U[10,20)	(~,-2) U(3,10)	Ø	CQA
3	$\left((-1,9]\cup[10,20)\right)\cap\mathbb{N}$	(1,20)	la, 20 9	[9, 870[10,10)	(+,) v (3,10)	Ø	O A
4	{1,2,3}	(2)	14,34	A	RIA	Ø	CLA
5	N	A	2	7	RIN	9	2
6	ℝ\{1,2,3}	A	Ø	(a) U(5,00)	81,2,37	Ø	QA
7	R/N	(-2,0)UR121	Ø	(- 00, 0)	M	Ø	(, 0]
8	Z	(+,**)	R	Q	R12	P	Q
9	$\mathbb{R}\backslash\mathbb{Z}$				7	Ø	0
	12 /22	A	9	0	7		
10	Q	A	R		0	Ø	R
10				R	RV(RVa)	A	R
	Q		R		0	Ø	