MAT1375, Classwork1, Fall2025

ID:______________________________ Name:______________________________

Ch1. Intervals and Functions

1. Set Notation of a set:

(1) Let V be a set including all the five main vowels in English alphabet. V = $\{a, e, i, o, u\}$.

(2) Let O be a set with all the odd positive numbers. O = $\{1, 3, 5, 7, 9, \cdots\}$.
$\{x \mid$ all odd possitive numbers$\}$

such that

In general, we have $S = \{x \mid$ either list all the elements or give a description$\}$.

2. Number systems:

$\mathbb{N} = \{0, 1, 2, 3, \cdots\}$; Natural Number

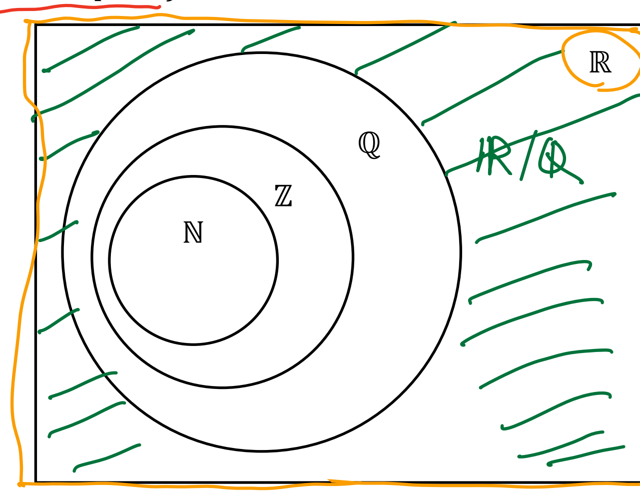
$\mathbb{Z} = \{\cdots, -3, -2, -1, 0, 1, 2, 3, \cdots\}$, Integers

$\mathbb{Q} = \{x = \frac{a}{b} \mid a \in \mathbb{Z}, b \in \mathbb{Z}^{+}\}$; rational numbers
a, b are integers, $b \neq 0$

$\mathbb{R}\backslash\mathbb{Q}$: irrational numbers. π, $\sqrt{2}$, e

$\mathbb{R}$ = All real numbers

$\mathbb{C} = \{x = a + ib \mid a \in \mathbb{R}, b \in \mathbb{R}\}$; Complex numbers.



3. The Intervals: sets of all real numbers between two numbers

Let a and b be real numbers with $a \leq b$. We have ~~$[-\infty, b]$~~

$[a, b] = \{x \mid a \leq x \leq b\}$,	a b
$(a, b] = \{x \mid a < x \leq b\}$,	a b
$[a, b) = \{x \mid a \leq x < b\}$,	a b
$(a, b) = \{x \mid a < x < b\}$.	a b
$(-\infty, b) = \{x \mid -\infty < x < b\}$,	b
$(-\infty, b] = \{x \mid -\infty < x \leq b\}$,	b
$[a, \infty) = \{x \mid a \leq x < \infty\}$,	a
$(a, \infty) = \{x \mid a < x < \infty\}$.	a

4. Complete the table

Inequality notation	Number line	Interval notation
$-3 < x < 5$	−3 5	$(-3, 5)$
$-1 < x \leq 2$	−1 2	$(-1,2]$
$-\infty < x < 3$	3	$(-\infty, 3)$

Interval $(2, -3) \Longrightarrow x > 2$ and $x < -3 \Longrightarrow$ It is an interval with nothing

5. The definition of a Function:

Let A and B be nonempty sets. A function f from A to B is an assignment of exactly one element of B to each element of A, denoted by f: $A \to B$ which is read as f maps A to B. Then we say that A is the input domain of f and B is the output Codomain of f.

6. If $f(a) = b$, we say that b is the image of a and the range of f is the set of all images of elements of A.

7. Suppose that each student in 1375 is assigned a letter grade from the set $G = \{A, B, C, D, F\}$. And suppose that grades are A for Adams, C for Chou, B for Goodman, A for Rod, and F for Stevens.

Let $S = \{\text{Adams, Chou, Goodman, Rod, Stevens}\}$ be the set of the students.

(a) Is $f: S \to G$ a function?

(b) What is the domain, range, and codomain of f?

(c) Is $g: G \to S$ a function?

(a) Adams → A
Chou → C
Goodman → B
Rod → A
D
Stevens → F

Yes. it's a function

(b) {Adams, Chou, Goodman, Rod, Stevens}

Codomain = {A, B, C, D, F}

range = {A, B, C, ~~D~~, F}

range is smaller than Codomain

8. The tables below describe assignments between inputs x and outputs y. Determine which of the given tables describe a function. If they do, determine their domain and range. Describe which outputs are assigned to which inputs.

a)

x	19	7	6	-2	3	-11
y	3	3	3	3	3	3

b)

x	1	2	3	4	4	5
y	5.3	9	13	17	15	$\sqrt{19}$