

# CIT 5920 — Lecture 2: Sets (part 2)

05 - 06 Sep 2024

Poll results

# Table of contents

- Sets: Special Sets
- Sets: Set-Builder Notation
- Sets: Subsets

Sets: Special Sets (1/5)

0 5 7

**Which of the following numbers is NOT a natural number?**

0

 9 %

-1 ☒

 91 %

5

 0 %

2

 0 %

**Which of the following is an irrational number?**

$1/2$

☐ 0 %

3.14

☐ 0 %

$\sqrt{2}$  ☒

☒ 84 %

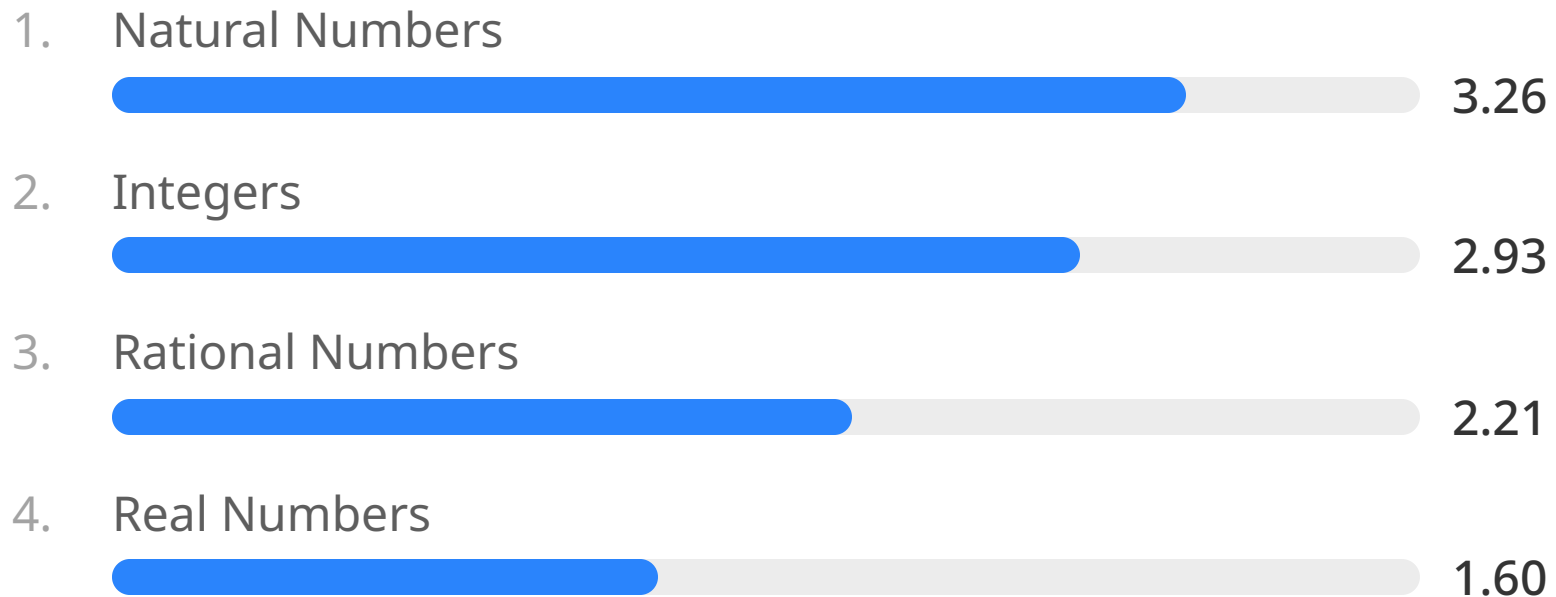
0.333...

☐ 16 %

Sets: Special Sets (3/5)

057

**Rank the following sets based on the number of elements they generally have, starting from the smallest.**



Sets: Special Sets (4/5)

0 5 1

**List three rational numbers that are not natural numbers.**

(1/2)

- 0.33, 0.88, 8.99
- -1, -2, -3
- -1,-2,-3
- $\frac{1}{3}$ ,  $\frac{7}{9}$ ,  $\frac{5}{7}$
- $\frac{1}{2}$  - $\frac{5}{3}$  -2
- $\frac{5}{2}$ ,  $\frac{3}{4}$ , - $\frac{10}{100}$
- 0.2, 1.5, 2.4
- -5, 3.3, -30
- 1.5, 7.33, -2
- -1 -2 -3
- -1 -2 -3
- $\{-3.5, -9, \frac{1}{\sqrt{3}}\}$
- -2,  $\frac{3}{4}$
- 1.5,2.5,3.5
- $-\frac{3}{2}$ , -1, -2
- $\frac{1}{2}$ , $\frac{3}{2}$ , $\frac{5}{2}$
- - $\frac{2}{1}$  - $\frac{4}{3}$  - $\frac{8}{5}$
- -1.3 -3.33 - $\frac{2}{3}$
- 0,3.1415926, $\frac{3}{2}$
- -1 -2 -3
- 0.5, -4.5, 0.3
- $-\frac{1}{3}$ , -1, -100.14
- 3.14, 7.8, 9.19
- 5.2, 3.4, 6.8
- -1, 1.3, 0.333..
- 0.5, -1, -100

Sets: Special Sets (4/5)

0 5 1

**List three rational numbers that are not natural numbers.**

(2/2)

- $\frac{1}{2}, \frac{1}{3}, \frac{1}{4}$
- -3,-4,-5
- $\frac{1}{2}, -8, \frac{7}{4}$
- -3, -4, -5
- 1.2 3.1415  $\frac{3}{4}$
- $\frac{1}{2}, \frac{7}{8}, -\frac{3}{4}$
- 0.5, 2.56, 0.333333
- 1.5, 2.3 8.888
- -1、 -2、 -3
- -1.5 -2.7 -3.6
- -2, -3, -4
- 2.56, 0.334, 0.4
- 1.1, 1.2, 1.3
- $\frac{1}{2}, -10, \frac{2}{3}$
- -15 -99 -0.5
- 3.14 9.8 -26.2
- -1, 0.5,  $\frac{7}{9}$
- 1.3, 2.5, 6.8
- $\frac{1}{3} \frac{2}{3} \frac{4}{3}$
- -3, -5, -250
- 0.2  $\frac{1}{2}$  0.999
- 2.5, 3.5, 4.5
- -1,  $\frac{3}{2}, \frac{5}{9}$
- -1, -2, -3
- $\frac{4}{7}$

Sets: Special Sets (5/5)

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**Check to see if you understand set cardinality:**  
(1/2)

$\{1\}$  has 1 element ✓



$\{1, 1, 1\}$  has 1 element ✓



$\{1, 2, 3, \dots\}$  has infinitely many elements ✓



$\{1, 1, 1\}$  has 3 elements



$\{1, 1, 1, \dots\}$  has infinitely many elements



**Check to see if you understand set cardinality:**  
(2/2)

$\{1, 2, 3\}$  has infinitely many elements

☐ 2 %

$\{1, 2, 3\}$  has three elements ✓

☒ 96 %

$\{\}$  has 0 elements ✓

☒ 81 %

$\emptyset$  has 0 elements ✓

☒ 75 %

Sets: Set-Builder Notation (1/5)

0 5 7

**What does the set  $\{x \in \mathbb{Z} \mid -3 \leq x \leq 3\}$  represent?**  
(1/2)

$\{-3, -2, -1, 0, 1, 2, 3\}$  ✓

 100 %

$\{-3, -2, -1, 0, 1, 2\}$

 0 %

$\{-2, -1, 0, 1, 2, 3\}$

 0 %

$\{-2, -1, 0, 1, 2, 3\}$

 0 %

$\{-1, 0, 1, 2\}$

 0 %

Sets: Set-Builder Notation (1/5)

0 5 7

**What does the set  $\{x \in \mathbb{Z} \mid -3 \leq x \leq 3\}$  represent?**

(2/2)

$\{0, 1, 2, 3\}$

☐ 0 %

Sets: Set-Builder Notation (2/5)

0 5 7

**What does the set  $\{x \in \mathbb{N} \mid -3 \leq x \leq 3\}$  represent?**

(1/2)

$\{-3, -2, -1, 0, 1, 2, 3\}$

☒ 9 %

$\{-3, -2, -1, 0, 1, 2\}$

☐ 0 %

$\{-2, -1, 0, 1, 2, 3\}$

☐ 0 %

$\{-2, -1, 0, 1, 2, 3\}$

☐ 0 %

$\{-1, 0, 1, 2\}$

☐ 0 %

Sets: Set-Builder Notation (2/5)

057

**What does the set  $\{x \in \mathbb{N} \mid -3 \leq x \leq 3\}$  represent?**

(2/2)

$\{0, 1, 2, 3\}$  ✓



Sets: Set-Builder Notation (3/5)

057

**What does the set  $\{ x \in \text{IvyLeagueUniversities} \mid x \text{ is the best} \}$  represent?**

{ Penn } ✓



{ Harvard }



{ Princeton }



{ MIT }



Sets: Set-Builder Notation (4/5)

057

**Let  $\text{Odd} = \{ x \in \mathbb{N} \mid x \text{ is odd} \}$ . Pick all that apply.**

$0 \in \text{Odd}$

☐ 5 %

$1 \in \text{Odd}$  ✓

☒ 81 %

$2 \in \text{Odd}$

☐ 2 %

$\text{Odd} = \{ 1, 3, 5, 7, \dots \}$  ✓

☒ 96 %

Sets: Set-Builder Notation (5/5)

0 5 7

**Let  $T = \{ x \in \mathbb{N} \mid x \text{ is a multiple of } 3 \}$ . Pick all that apply.**  
(1/2)

T contains 3 elements

☐ 5 %

T contains an infinite number of elements ✓

☒ 95 %

T contains negative numbers

☐ 4 %

$3 \in T$  ✓

☒ 95 %

$9 \in T$  ✓

☒ 93 %

Sets: Set-Builder Notation (5/5)

0 5 7

**Let  $T = \{ x \in \mathbb{N} \mid x \text{ is a multiple of } 3 \}$ . Pick all that apply.**

(2/2)

$13 \in T$

☐ 0 %

$0 \in T$  ✓

☒ 60 %

$T = \{ 0, 3, 6, 9, \dots \}$  ✓

☒ 79 %

Sets: Subsets (1/4)

057

**Is the set  $\{1, 2, 3\}$  a subset of  $\{1, 2, 3, 4, 5\}$ ?**

YES ✓



NO

☐ 2 %

**Which of the following is a subset of  $\{1, 2, 3\}$ ?**

$\{1, 2, 4\}$

☐ 0 %

$\{1, 2\}$  ✓

☒ 98 %

$\{3, 4, 5\}$

☐ 0 %

$\{2, 3, 4\}$

☐ 0 %

$\{1\}$  ✓

☒ 100 %

Sets: Subsets (3/4)

057

**Are all subsets of  $\{1, 2, 3\}$  also subsets of  $\{1, 2, 3, 4, 5\}$ ?**

YES ✓



NO

0 %

Sets: Subsets (4/4)

057

**Which of the following is a subset of  $\{4, 1, 8\}$ ?**  
(1/2)

$\{4, 8\}$  ✓



$\{4, \{8\}\}$



$\{1, 8\}$  ✓



$\{1, 4, 8\}$  ✓



$\{1\}$  ✓



Sets: Subsets (4/4)

057

**Which of the following is a subset of  $\{4, 1, 8\}$ ?**  
(2/2)

$\{\}$  ✓

