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# Assignment 4: Elementary Set Theory Mathematical Logic (C11B3)

## Problem 1

- $N_0$ : bilangan cacah
- $Z$ : bilangan bulat
- $Q$ : bilangan rasional
- $R$ : bilangan real
- $C$ : bilangan kompleks

Jawaban:

No.	Bilangan	$N_0$	$Z$	$Q$	$R$	$C$
b	$300/4 = 75$	✓	✓	✓	✓	✓
c	$\sqrt{5/2}$				✓	✓
d	$\sqrt{5}i$					✓
e	$x: 3^x - 5^x \rightarrow 0$	✓	✓	✓	✓	✓
f	$x: 4^x = 1024 \rightarrow x = 5$	✓	✓	✓	✓	✓
g	$x: 9x^2 = 24 \rightarrow x = 2/3$			✓	✓	✓
h	$x: 9x^2 - 1 = 0 \rightarrow x = \pm 1/3$			✓	✓	✓
i	$x: x^2 + 2x + 1 = 0$					✓
j	$x: 3^x = 0$				✓	✓
k	$x: 4x^2 + 1 = 0$					✓

## Problem 2

- Benar, karena 0 adalah anggota dari himpunan kosong
- Salah, himpunan kosong bukan anggota dari  $\{0\}$
- Benar, karena  $\emptyset$  adalah subset dari semua himpunan
- Benar, karena setiap himpunan adalah subset dirinya
- Benar, karena himpunan  $\{0\}$  adalah subset dari sendiri

## Problem 3

- $P(A) = \{\emptyset, \{x\}\}$
- $P(B) = \{\emptyset, \{x\}, \{y\}, \{x, y\}\}$
- $P(C) = \{\emptyset, \{0\}, \{x\}, \{0, x\}\}$
- $P(D) = \{\emptyset, \{0\}, \{0, \emptyset\}, \{\emptyset, \{0\}\}, \{\emptyset, \{0, \emptyset\}\}\}$
- $P(E) = \{\emptyset, \{x\}, \{y\}, \{z\}, \{x, y\}, \{x, z\}, \{y, z\}, \{x, y, z\}\}$

## Problem 4

- $|P(\{a\})| = 2$
- $|P(\{a, \{a, b\}\})| = 4$
- $|P(\{a, b, \{a, b\}\})| = 8$
- 16
- 2

## Problem 5

- tentukan

$$A = \{1, 2, 3, 4, 6, 8\}$$

$$B = \{3, 6, 9\}$$

$$C = \{2, 3, 5, 7\}$$

Jawaban:

$$a. A \cup B \cup C = \{1, 2, 3, 4, 5, 6, 7, 8, 9\}$$

$$b. A \cap B \cap C = \{3\}$$

$$c. A - B = \{1, 2, 4, 8\}$$

$$d. B - C = \{6, 9\}$$

$$e. P(B - C) = \{\emptyset, \{6\}, \{9\}, \{6, 9\}\}$$

## Problem 6

$$a. A \cup B \cup C = \{1, 2, 3, 4, 5\}$$

$$b. (A \cap B \cap C)' = \{1, 4, 5, 6\}$$

$$c. (A - B) - C = \{5, 4\}$$

$$d. A - (B - C) = \{1, 2, 3, 4\}$$

$$e. (A \cap B) \Delta C = \{1, 5\}$$

## Problem 7

$$1. \bigcup_{k=1}^{2020} A_k$$

$$A_1 = \{2, 4, 6, \dots\}$$

$$A_2 = \{4, 6, 8, \dots\}$$

$$A_3 = \{6, 8, 10, \dots\} \dots \text{dst } A_{2020}$$

$$\text{Union } A_k = \{2, 3, 4, \dots\}$$

$$b. \bigcap_{k=1}^{2020} A_k = \{4040, 4042, 4044, \dots\}$$

$$c. \bigcup_{k=1}^{2020} B_k = \{1, 2, 3, \dots, 2020\}$$

$$d. \bigcap_{k=1}^{2020} B_k = \{1\}$$

### Problem 8

a.  $|A| = 22200$

b.  $|B| = 16650$

c.  $|A \cap B| = 850$

d.  $|A \cup B| = 33700$

e.  $|A \Delta B| = 24750$

### Problem 9

Misalkan:

C: Ilmu komputer

B: Bisnis

total: 350

$\Rightarrow$

$$C = 220$$

$$B = 147$$

$$C \cap B = 51$$

$$C \cup B = 220 + 147 - 51 = 316$$

Jang tidak mengambil keduanya

$$= 350 - 316 = 34 \text{ orang.}$$

### Problem 10

$$\text{total} = 2504$$

$$\text{Jawa (J)} = 1016$$

$$\text{Pascaw} : 999$$

$$C : 345$$

$$\Rightarrow J \cap P : 816$$

$$P \cap C = 231$$

$$J \cap C = 296$$

$$J \cap P \cap C = 109$$

$$= 2504 - (1016 + 999 + 345 - 816 - 231 - 296 + 109) = 1302 \text{ orang}$$