

Assignment 3

Q1. Set equality

You will be given two sets, A and B. Determine if
 $A=B$
 $A \neq B$
or if it is impossible to tell without more information

Q1.1. Odds less than 3

$A =$ The set of odd positive integers less than 3
 $B = \{1, 3\}$

- A. $A=B$
- B. $A \neq B$
- C. Impossible to tell without further information

Q1.2. Primes

$A = \{x \mid \text{x is a prime number}\}$
 $B = \{x \mid \text{x is odd}\}$

- A. $A=B$
- B. $A \neq B$
- C. Impossible to tell without further information

Q1.3. Order

$A = \{1, 2, 3\}$
 $B = \{3, 2, 1\}$

- A. $A=B$
- B. $A \neq B$
- C. Impossible to tell without further information

Q1.4. Repetition

$A = \{1, 2, 3, 4, 2, 3, 4, 2, 3\}$
 $B = \{1, 1, 1, 2, 3, 4\}$

- A. $A=B$
- B. $A \neq B$
- C. Impossible to tell without further information

Q1.5. Age

$A = \{x \mid x \text{ is the age of a staff member at kibo}\}$
 $B = \{18, 19, 20, 21, 23, 30, 33, 46\}$

- A. $A = B$
- B. $A \neq B$
- C. Impossible to tell without more information.

Q2. Item membership

Determine if the element x belongs to the set A

Q2.1.

$x = 1$
 $A = \{1, 2, 3\}$

- A. $x \in A$
- B. $x \notin A$
- C. Impossible to determine without more information.

Q2.2.

$x = \text{red}$
 $A = \{\text{red}, \text{blue}, \text{green}\}$

- A. $x \in A$
- B. $x \notin A$
- C. Impossible to determine without more information.

Q2.3.

$x = \text{Sets}$
 $A = \{a \mid a \text{ is a topic in mathematical thinking}\}$

- A. $x \in A$
- B. $x \notin A$
- C. Impossible to determine without more information.

Q3. Subsets

Determine whether the set A is a subset of the set B

Q3.1. Special sets

$$A = \mathbb{N}$$

$$B = \mathbb{Z}$$

- A. $A \subseteq B$
- B. $A \not\subseteq B$
- C. Impossible to tell without more information.

Q3.2. Males

$$A = \{x \mid x \text{ is a male student at Kibo}\}$$

$$B = \{x \mid x \text{ is a student at Kibo}\}$$

- A. $A \subseteq B$
- B. $A \not\subseteq B$
- C. Impossible to tell without more information.

Q3.3. Singletons

$$A = \{1\}$$

$$B = \{\{1\}, \{2\}, \{3\}\}$$

- A. $A \subseteq B$
- B. $A \not\subseteq B$
- C. Impossible to tell without more information.

Q4. Set operations

Determine the resulting set from the sets A and B and the given set operation

Q4.1. Union

$$A = \{1, 2, 3\}$$

$$B = \{3, 4, 5\}$$

$$A \cup B$$

- A. $\{3\}$
- B. $\{1, 2, 3, 4, 5\}$

C. $\{1,2,4,5\}$

D. None of the above

Q4.2. Intersection

$$A = \{1,2,3\}$$

$$B = \{3,4,5\}$$

$$A \cap B$$

A. $\{3\}$

B. $\{1,2,3,4,5\}$

C. $\{1,2,4,5\}$

D. None of the above

Q4.3. Set difference

$$A = \{1,2,3\}$$

$$B = \{3,4,5\}$$

$$A \setminus B$$

A. $\{3\}$

B. $\{1,2,3,4,5\}$

C. $\{1,2,4,5\}$

D. None of the above

Q5. Number of subsets

How many subsets does the set $\{\text{one, two, three}\}$ have?

A. 3

B. 4

C. 8

D. None of the above

Q6. True or false

Determine whether the following statements are always true, or if they have an instance that makes them false.

Q6.1. Subset transitivity

If $A \subseteq B$ and $B \subseteq C$, then $A \subseteq C$.

- A. True
- B. False

Q6.2. Membership transitivity

If $A \in B$ and $B \in C$, then $A \in C$.

- A. True
- B. False

Q6.3. Double containment

If $A \subseteq B$ and $B \subseteq A$, then $A = B$.

- A. True
- B. False