

MATH 101 QUIZ #1 (SPRING 2021)

1a Express $\{3, 4, 5, 6, 7, 8, 9, 10, 11\}$ in set-builder notation. There are several possibilities, a couple being $\{x \mid x \in \mathbb{N} \ \& \ 3 \leq x \leq 11\}$ or $\{x \in \mathbb{N} \mid 3 \leq x \leq 11\}$.

1b Express $\{5, 10, 15, 20, \dots\}$ in set-builder notation. $\{5x \mid x \in \mathbb{N}\}$.

2a Determine whether the sets $A = \{\text{purple, orange, yellow}\}$ and $B = \{x, y, z\}$ are equal, equivalent, both, or neither. Equivalent.

2b A is the set of U.S. states and B is the set of U.S. state capitals. Determine whether the sets are equal, equivalent, both, or neither. Equivalent.

3a True or false: $\{0\} = \emptyset$. If false, give a reason. False, since \emptyset has no elements, while $\{0\}$ has 0 as an element.

3b True or false: $\{a\} \subseteq \{\{a\}, \{b\}\}$. If false, give a reason. False, since $\{a\}$ has a as its only element, but the elements of $\{\{a\}, \{b\}\}$ are $\{a\}$ and $\{b\}$.

3c True or false: $\emptyset \subset \emptyset$. If false, give a reason. False, since by definition no set can be a proper subset of itself.

3d True or false: $U \subseteq \emptyset$ if $U \neq \emptyset$. If false, give a reason. False, since $U \neq \emptyset$ implies U contains something, and thus it cannot be a subset of the set that contains nothing.