

Skill Mastery Quiz 10
Communicating in Math (MTH 210-01)
Winter 2020

Name:

S1-3 Let $A = \{0, 1, 2, 3, \{4\}\}$. Fill in a correct symbol (from $\in, \subset, \subseteq, =, \neq$) for each of the following.

1. $\{4\}$ ____ A
2. $\{2\}$ ____ A
3. $\{1, 2, 3\}$ ____ A

S2-3 Let $U = \{1, 2, 3, 4, 5, 6, 7, 8, 9, 10\}$ be the universal set. Let $A = \{2, 4, 6, 8, 10\}$ and $B = \{1, 3\}$.

1. Find $A \cap B$.
2. Find A^C .
3. Find $A - B$.
4. Find $A \cup B$.

S3-2 Let $\mathbb{R}^* = \{x \in \mathbb{R} : x \geq 0\}$. Let $s : \mathbb{R}^* \rightarrow \mathbb{R}^*$ be defined by $f(x) = x^2$.

1. State the domain, codomain of f . (Clearly state which one is which.)
2. Find the image(s) of 3 under f .
3. Find the preimage(s) of 4.

S4-1 Let A and B be sets. Carefully complete the definitions of the following terms. (Note: “no collisions” and “range=codomain” are helpful ways to think about these, but they are NOT the definitions.)

1. A function $f : A \rightarrow B$ is injective provided that...

2. A function $f : A \rightarrow B$ is surjective provided that...

3. A function $f : A \rightarrow B$ is bijective provided that...

S6-1 Let $r, s \in \mathbb{Z}$ and $n \in \mathbb{N}$. State the definitions of the following:

– $r \mid s$ (for nonzero r)

– $r \equiv s \pmod{n}$.

Give an example of integers a and b such that $a \equiv b \pmod{15}$ and $b < 0$.