Ideas in Mathematics, Fall 2023, Weekly worksheet 2

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1. Write out the sets below using set-builder notation. There may be more than one way to write the answer. For example, the set $\{5, 6, 7, 8, 9, \ldots\}$ could be written as $\{n \in \mathbb{N} | n \geq 5\}$ or $\{n + 4 | n \in \mathbb{N}\}$.

   (a) $\{-3, -2, -1, 0, 1, 2, \ldots\}$ can be written as

   _____in set builder notation.

   (b) $\{3, 6, 9, 12, \ldots\}$ can be written as

   _____in set builder notation.

   (c) $\{1, 3, 5, 7, 9, 11, \ldots\}$ can be written as

   _____in set builder notation.

   (d) $\{2/3, 3/4, 4/5, 5/6, \ldots\}$ can be written as

   _____in set builder notation.

2. Suppose A is a subset of B.

Is it always true that $B \setminus (B \setminus A) = A$? Why or why not?

3. Suppose A is a subset of B and let $\overline{A} = B \setminus A$. Let C be any other set.

(a) Explain why C is always a subset of $(A \cup C) \cap (\overline{A} \cup C)$.

(b) Explain why $(A \cup C) \cap (\overline{A} \cup C)$ is always a subset of C.

(c) Does this imply $(A \cup C) \cap (\overline{A} \cup C) = C$? Why or why not?