Skill Mastery Quiz 9

Communicating in Math (MTH 210-01)
Winter 2020

Name:

P2-3 For which of the following situations is it more appropriate to use induction (circle one).

1. For all $a \in \mathbb{Z}$ the equation $ax^3 + ax + a = 0$ does not have a solution that is a natural number.
2. For each natural number n,

$$3 + 6 + 9 + \cdots + 3n = \frac{3n(n+1)}{2}.$$

.

Explain why you chose that statement to prove by induction.

For the statement you chose, state what your steps would be in a proof by induction.

S1-2 Let $A = \{1, 2, 4\}$ and $B = \{1, 2, 4, 5\}$. From the list $\in, \notin, =, \neq, \subseteq, \not\subseteq, \subset, \not\subset$, fill in a correct symbol for each of the following:

- A___B
- $\emptyset$___A
- $\{4, 2, 1\}$___B
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-
-

S2-2 Let $U = \mathbb{Z}$. Let $A = \{x \in \mathbb{Z} : x \geq 7\}$ and $B = \{x \in \mathbb{Z} : x \text{ is odd}\}$. (Roster method is okay for your answers, but make sure the pattern is clear.)

1. Find $A \cap B$

2. Find $A \cup B$

3. Find A^C

4. Find $A - B$

S3-1 Let $f : \mathbb{R} \to \mathbb{R}$ be defined by $f(x) = x^2 - 2$.

1. State the domain, codomain, and range of f. (Clearly state which one is which. You can graph this if it helps you.)

2. Find the image(s) of 3 under f.

3. Find the preimage(s) of 0.