

Questions 1: Sets and Mappings

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Question 1

Consider a set of all integers $z \in \mathbb{Z}$ such that $z^2 < 10$. Write this set in a set comprehension notation. Is this a finite set? What happens if the condition is changed to $z^3 < 10$?

Question 2

Let $X = \{a, b, c, d, e\}$ and $Y = \{1, 2, 3, 4, 5\}$. Consider the following correspondences $R \subseteq X \times Y$:

$$\begin{aligned} f & : \{(a, 1), (a, 2), (a, 3), (b, 4), (c, 5)\} \\ g & : \{(a, 4), (b, 4), (c, 4), (d, 4), (e, 4)\} \\ h & : \{(a, 5), (b, 4), (c, 3), (d, 2), (e, 1)\} \end{aligned}$$

Which of the above are functions (mappings)? Which functions are surjective (onto), injective (one-to-one) or bijective (one-to-one correspondence)? Which has an inverse function?