

Lecture 1 - Practice Questions

1. Let $f : \mathbb{Z} \rightarrow \mathbb{Z}$ such that $f(x) = x^2$. Which of the following statements is not true?
 - A. $f(-1) = -1$
 - B. $f(1) = 1$
 - C. $f(0) = 0$
 - D. $f(2) = 4$
2. Which of the following is not a function with domain \mathbb{Z} and codomain \mathbb{R} ?
 - A. $f(x) = \pm x$
 - B. $f(x) = \sqrt{x^2}$
 - C. $f(x) = x$
 - D. $f(x) = \ln(x^2 + 1)$
3. Consider the function $f : \mathbb{N} \rightarrow \mathbb{Z}$ such that $f(x) = x - 100$. What is the codomain of f ?
 - A. \mathbb{N}
 - B. \mathbb{Z}
 - C. \mathbb{Z}_+
 - D. \mathbb{R}
4. Consider the function $f : \mathbb{R} \rightarrow \mathbb{R}$ such that $f(x) = x^2$. What is the image of -1 ?
 - A. -1
 - B. 1
 - C. 2
 - D. \mathbb{R}
5. Let $f : \{-2, -1, 0\} \rightarrow \mathbb{Z}$ such that $f(x) = x^2$. What is the image of f ?
 - A. $\{-2, -1, 0\}$
 - B. $\{0, 1, 2\}$
 - C. \mathbb{Z}
 - D. None of the others
6. Which of the following functions $f : \mathbb{R}_+ \rightarrow \mathbb{R}_+$ is not invertible?
 - A. $f(x) = x$
 - B. $f(x) = x^2$
 - C. $f(x) = x^3$
 - D. None of the others
7. Let $f : \mathbb{R} \rightarrow \mathbb{R}$, $f(x) = x^3$. What is $f^{-1}(-1)$?
 - A. -3

- B. -1
- C. 1
- D. 3

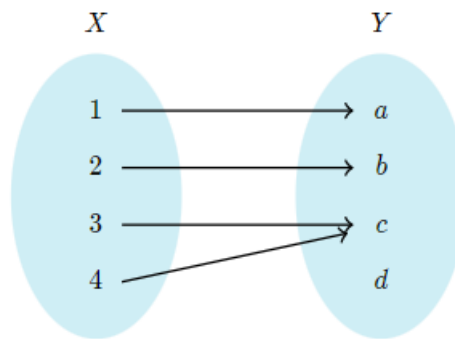
8. Consider the function $f : \mathbb{R}_+ \rightarrow \mathbb{R}_+$, $f(x) = x^2$. Which of the following statements is correct?

- A. It is both injective and surjective
- B. It is injective but not surjective
- C. It is surjective but not injective
- D. It is neither injective nor surjective

9. Which of the following functions $f : \mathbb{R} \rightarrow \mathbb{R}$ is not surjective?

- A. $f(x) = 2x$
- B. $f(x) = -3x + 4$
- C. $f(x) = x^3 + 1$
- D. $f(x) = x^2 - 3$

10. A function $f : X \rightarrow Y$ is given by the graph below. Which of the following statements is correct?



- A. The function is injective and surjective
- B. The function is injective but not surjective
- C. The function is surjective but not injective
- D. The function is neither injective nor surjective

11. Let f be functions with domain $\{a, b, c\}$ and codomain $\{0, 1, 2\}$. Which of the following functions is bijective?

- A. $f(a) = f(b) = f(c) = 1$
- B. $f(a) = 0, f(b) = 1, f(c) = 2$
- C. $f(a) = 2, f(b) = 1, f(c) = 2$
- D. $f(a) = f(b) = f(c) = 2$

12. Let $f : \{a, b\} \rightarrow \{0, 1, 2, 3\}$ such that $f(a) = 0, f(b) = 3$. Which of the following statements is correct?

- A. The function is neither injective nor surjective
- B. The function is injective but not surjective
- C. The function is surjective but not injective
- D. The function is both injective and surjective

Question	Correct Answer
1	A
2	A
3	B
4	B
5	D
6	D
7	B
8	A
9	D
10	D
11	B
12	B