Self-Assessment Quiz: Types of Functions (Lectures 6–7)

Ungraded Quiz – For Practice and Understanding

Q1. A function $f : X \to Y$ is said to be **one-to-one** (injective) if:

(a) $f(x_1) = f(x_2)$ implies $x_1 = x_2$

(b) Every element of Y has a preimage in X

(c) $f(x_1) \neq f(x_2)$ for all x_1, x_2

(d) $f(x) = c$ for all $x \in X$

Q2. Which of the following functions is **not one-to-one**?

(a) $f(x) = 4x - 1$

(b) $g(x) = x^2$

(c) $h(x) = x + 3$

(d) $f(x) = 3x$

Q3. A function $f : X \to Y$ is called **onto** (surjective) if:

(a) Each element of X maps to a unique element of Y

(b) Every element of Y is an image of at least one element of X

(c) $f(x_1) = f(x_2)$ implies $x_1 = x_2$

(d) $f(x) = c$ for some constant c

Q4. If $f(x) = 4x - 1$, then f is:

(a) One-to-one only

(b) Onto only

(c) Bijective

(d) Neither one-to-one nor onto

Q5. The **identity function** on a set X is defined by:

(a) $i_X(x) = x^2$

(b) $i_X(x) = x$

(c) $i_X(x) = 0$

(d) $i_X(x) = 1$

Q6. A function that is both one-to-one and onto is called:

(a) Surjective

(b) Injective

(c) Constant

(d) Bijective

Q7. Which of the following is a **constant function**?

(a) $f(x) = 3x$

(b) $f(x) = 2x + 1$

(c) $f(x) = 7$

(d) $f(x) = x^2$

Q8. If f and g are functions such that $f(x) = 2x+3$ and $g(x) = x^2$, then the composition $(g \circ f)(x)$ equals:

(a) $2x^2 + 3$

(b) $(2x + 3)^2$

(c) $4x + 6$

(d) $2x^2 + 9$

Q9. The inverse function of $f(x) = 4x - 1$ is:

(a) $f^{-1}(x) = 4x + 1$

(b) $f^{-1}(x) = \frac{x+1}{4}$

(c) $f^{-1}(x) = \frac{x-1}{4}$

(d) $f^{-1}(x) = 4x - 1$

Q10. Two functions f and g are said to be **equal** if:

(a) They have the same domain only

(b) $f(x) = g(x)$ for all x in their common domain

(c) $f(x) \neq g(x)$ for at least one x

(d) Their co-domains are different

Q11. If $f(x) = x + 1$ and $g(x) = x^2$, then $(f \circ g)(x)$ equals:

(a) $x^2 + 1$

(b) $(x + 1)^2$

(c) $x^2 + x$

(d) $x + 1$

Q12. Which statement is **true** about the inverse of a bijective function?

(a) It is always surjective but not injective

(b) It may not exist

(c) It is also bijective

(d) It is always constant

Answers (for self-check):
1(a), 2(b), 3(b), 4(c), 5(b), 6(d), 7(c), 8(b), 9(b), 10(b), 11(a), 12(c)