

# Self-Assessment Quiz: Continuity (Lecture 4)

*Ungraded Quiz – For Practice and Understanding*

**Q1.** A function  $f(x)$  is said to be **continuous at**  $x = a$  if:

- (a)  $\lim_{x \rightarrow a^-} f(x) = \lim_{x \rightarrow a^+} f(x) = f(a)$
- (b)  $\lim_{x \rightarrow a} f(x)$  does not exist
- (c)  $f(a)$  is undefined
- (d) The function is differentiable at  $a$

**Q2.** If  $\lim_{x \rightarrow 2^-} f(x) = 3$  and  $\lim_{x \rightarrow 2^+} f(x) = 5$ , then  $f(x)$  at  $x = 2$  is:

- (a) Continuous
- (b) Discontinuous (jump discontinuity)
- (c) Continuous only from right
- (d) Continuous only from left

**Q3.** The condition for a function  $f(x)$  to be continuous on an interval  $(a, b)$  is:

- (a) It is continuous at every point in  $(a, b)$
- (b) It is continuous only at  $a$
- (c) It has a limit at  $b$
- (d) It is differentiable in  $(a, b)$

**Q4.** If  $f(x) = \frac{x^2 - 9}{x - 3}$ , then  $f(x)$  is discontinuous at:

- (a)  $x = 0$
- (b)  $x = 2$
- (c)  $x = 3$
- (d) None of these

**Q5.** What type of discontinuity occurs when the left-hand and right-hand limits exist but are not equal?

- (a) Removable
- (b) Jump
- (c) Infinite
- (d) Essential

**Q6.** If  $\lim_{x \rightarrow a} f(x)$  exists but  $\lim_{x \rightarrow a} f(x) \neq f(a)$ , then:

- (a)  $f$  is continuous at  $a$
- (b)  $f$  has a removable discontinuity at  $a$
- (c)  $f$  has a jump discontinuity at  $a$

(d)  $f$  has an infinite discontinuity at  $a$

**Q7.** The product of two continuous functions is:

- (a) Always continuous
- (b) Never continuous
- (c) Continuous only if both are differentiable
- (d) Continuous only if both are positive

**Q8.** If  $f(x)$  and  $g(x)$  are continuous at  $x = a$ , then  $f(x) + g(x)$  is:

- (a) Not continuous at  $a$
- (b) Continuous at  $a$
- (c) Continuous only if  $f(a) = g(a)$
- (d) Continuous only if  $f(a) = 0$

**Q9.** A function that is continuous on a closed interval  $[a, b]$  is guaranteed to:

- (a) Have a maximum and minimum value
- (b) Be differentiable
- (c) Be constant
- (d) Have no limits

**Q10.** Which of the following is an example of a continuous function?

- (a)  $f(x) = \frac{1}{x}$  at  $x = 0$
- (b)  $f(x) = |x|$
- (c)  $f(x) = \tan(x)$  at  $x = \pi/2$
- (d)  $f(x) = \frac{1}{x-2}$  at  $x = 2$

**Answers (for self-check):**

1(a), 2(b), 3(a), 4(c), 5(b), 6(b), 7(a), 8(b), 9(a), 10(b)