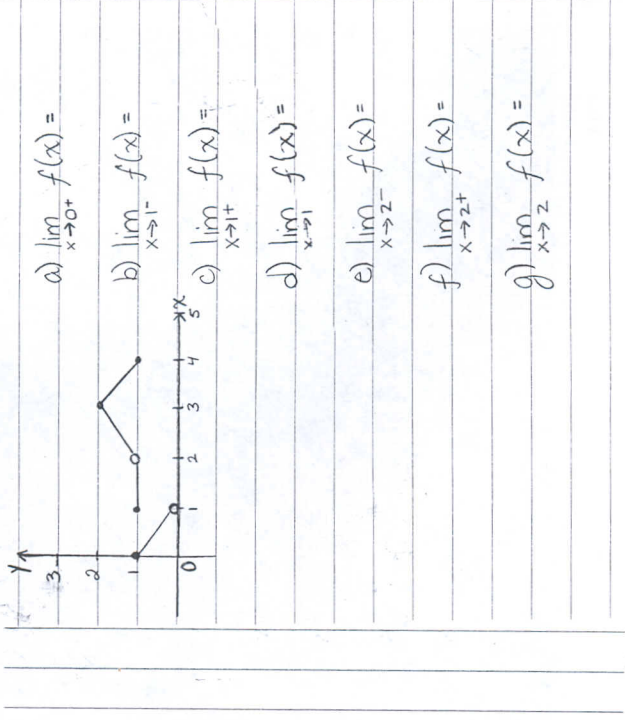


Multiple-Choice Questions on Limits and Continuity

- 1) $\lim_{x \rightarrow 4} \frac{x^2 - 4}{x + 4}$ is
 (A) 1 (B) 0 (C) $-\frac{1}{2}$ (D) -1 (E) ∞
- 2) $\lim_{x \rightarrow 1} \frac{4 - x^2}{x^2 - 1}$ is
 (A) 1 (B) 0 (C) -4 (D) -1 (E) ∞
- 3) $\lim_{x \rightarrow 3} \frac{x - 3}{x^2 - 2x - 3}$ is
 (A) 0 (B) 1 (C) $\frac{1}{4}$ (D) ∞ (E) none of these
- 4) $\lim_{x \rightarrow 0} \frac{x}{x}$ is
 (A) 1 (B) 0 (C) ∞ (D) -1 (E) nonexistent
- 5) $\lim_{x \rightarrow 4} \frac{x^2 - 8}{x^2 - 4}$ is
 (A) 4 (B) 0 (C) 1 (D) 3 (E) ∞
- 6) $\lim_{x \rightarrow 2} \frac{5x^2 + 27}{20x^2 + 10x + 9}$ is
 (A) ∞ (B) $\frac{1}{4}$ (C) 3 (D) 0 (E) 1
- 7) $\lim_{x \rightarrow 2} \frac{3x^2 + 27}{x^2 - 27}$ is
 (A) 3 (B) ∞ (C) 1 (D) -1 (E) 0
- 8) $\lim_{x \rightarrow 2} \frac{2}{x}$ is
 (A) -1 (B) 1 (C) 0 (D) ∞ (E) none of these

- 9) $\lim_{x \rightarrow 0} \frac{1 + 2x}{x}$ is
 (A) 1 (B) 2 (C) $\frac{1}{2}$ (D) 0 (E) $-\infty$
- 10) $\lim_{x \rightarrow 2} \frac{2x^2 + 1}{(2 - x)(2 + x)}$ is
 (A) -4 (B) -2 (C) 1 (D) 2 (E) nonexistent
- 11) $\lim_{x \rightarrow 0} |x|$ is
 (A) 0 (B) nonexistent (C) 1 (D) -1 (E) none of these
- 12) Let $f(x) = \begin{cases} x^2 - 1 & \text{if } x \neq 1 \\ 4 & \text{if } x = 1 \end{cases}$
 Which of the following statements, I, II, and III, are true?
 I. $\lim_{x \rightarrow 1} f(x)$ exists II. $f(1)$ exists III. f is continuous at $x = 1$
 (A) only I (B) only II (C) I and II (D) none of them (E) all of them

12) For the function f , find:



ANSWER KEY

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MULTIPLE CHOICE LIMITS & CONTINUITY QUIZ

$$1) \lim_{x \rightarrow 2} \frac{x^2 - 4}{x^2 + 4} = \frac{(2)^2 - 4}{(2)^2 + 4} = \frac{0}{8} = 0 \quad B$$

$$2) \lim_{x \rightarrow 0} \frac{4 - x^2}{x^2 - 1} = \frac{(2+x)(2-x)}{(x+1)(x-1)} \text{ DOESN'T HELP} = \frac{4 - x^2}{x^2 - 1} = -1 \quad D$$

$$3) \lim_{x \rightarrow 3} \frac{x - 3}{x^2 - 2x - 3} = \frac{x - 3}{(x-3)(x+1)} = \frac{1}{x+1} = \frac{1}{3+1} = \frac{1}{4} \quad C$$

$$4) \lim_{x \rightarrow 0} \frac{x}{x} = \lim_{x \rightarrow 0} 1 = 1 \quad A$$

$$5) \lim_{x \rightarrow 2} \frac{x^3 - 8}{x^2 - 4} = \frac{(x-2)(x^2 + 2x + 4)}{(x+2)(x-2)} = \frac{4 + 4 + 4}{4} = \frac{12}{4} = 3 \quad D$$

$$6) \lim_{x \rightarrow \infty} \frac{5x^3 + 27}{20x^2 + 10x + 9} = \frac{5x^3}{0} = \infty \quad A$$

$$7) \lim_{x \rightarrow \infty} \frac{3x^2 + 27}{x^3 - 27} = \frac{0}{\infty} = 0 \quad E$$

$$8) \lim_{x \rightarrow \infty} \frac{2^{-x}}{2^x} = 2^{-x} \cdot 2^{-x} = 2^{-2x} = 2^{-2 \cdot \infty} = 0 \quad C$$

approaches 0

$$9) \lim_{x \rightarrow 0} \frac{1 + 2 \log x}{x} = \frac{1 + 2(-0.0001)}{-0.0001} = \frac{0.9998}{-0.0001} = -9998 \quad E$$

only for solving variables changes shape of graph

$$10) \lim_{x \rightarrow \infty} \frac{2x^2 + 1}{(2-x)(2+x)} = \frac{2x^2 + 1}{4 - x^2} = \frac{2x^2}{-x^2} = -2 \quad B$$

$$(b) \lim_{x \rightarrow 0} |x| = 0 \quad A$$

graph

ii) $\lim_{x \rightarrow 1} f(x)$ exists 6, $f(1) = 4$ but not continuous C

12)

1
0
1
no limit
1
1
1