

SAMPLE

I. MULTIPLE CHOICE: #1-13: Directions: For the following multiple choice questions, place your answer on the blank space provided using only CAPITAL LETTERS. No work is required for the multiple choice questions.

1. _____ For the limit $\lim_{x \rightarrow -2} (-5x + 4) = 14$ when constructing a delta-epsilon proof according to the method demonstrated in class, what would be the choice for delta?
- A. Choose $\delta = \frac{\varepsilon}{|-2|}$ B. Choose $\delta = \frac{\varepsilon}{-5}$ C. Choose $\delta = \frac{\varepsilon}{|14|}$ D. Choose $\delta = \frac{\varepsilon}{|-5|}$ E. None of these
2. _____ Given that $\lim_{x \rightarrow 7} f(x) = 3$, based on that alone, which of the following MUST be true?
- A. All of B, C, and D must be true. B. $f(7) = 3$ C. $\lim_{x \rightarrow 7^-} f(x) = 3$
D. $f(x)$ is continuous at $x = 7$ E. None of these
3. _____ When constructing a delta-epsilon proof according to the method demonstrated in class, what is the third step of the three steps?
- A. Verify δ . B. Let $\varepsilon > 0$. C. Show $\varepsilon = \delta$. D. Search for δ . E. None of these
4. _____ Which of the following limits will require more work than just direct substitution?
- A. All of B, C and D B. $\lim_{x \rightarrow 8} \left(\frac{x-8}{x^2-64} \right)$ C. $\lim_{x \rightarrow 9} \left(\frac{x^2-81}{x+9} \right)$ D. $\lim_{x \rightarrow -\pi} \sin x$ E. None of these
5. _____ For the function $f(x) = \begin{cases} x^2 - 6, & x < 7 \\ 3x + 4, & x \geq 7 \end{cases}$ what is the value of $\lim_{x \rightarrow 7^-} f(x) =$?
- A. The limit does not exist B. 43 C. 25 D. 7 E. None of these
6. _____ Given that a function $f(x)$ is continuous at $x = 5$, based on that alone, which of the following MUST be true?
- A. All of B, C, and D must be true. B. $f(5)$ is defined C. $\lim_{x \rightarrow 5} f(x)$ exists
D. $\lim_{x \rightarrow 5} f(x) = f(5)$ E. None of these

7. _____ Given that $\lim_{x \rightarrow 5^-} f(x) = 27$, based on that alone, which of the following MUST be true?

A. All of B, C, and D must be true.

B. $\lim_{x \rightarrow 5^+} f(x) = 27$

C. $\lim_{x \rightarrow 5} f(x) = 27$

D. $f(5) = 27$

E. None of these

8. _____ For what x-values is the function $f(x) = \frac{x-5}{x^2-7x+12}$ discontinuous?

A. $x = 5$ & $x = 3$ & $x = 4$

B. $x = 5$ & $x = -3$ & $x = -4$

C. $x = 3$ & $x = 4$

D. $x = 5$

E. None of these

9. _____ Which of the following functions is continuous for all x-values in the interval $(-\infty, \infty)$?

A. All of B, C, and D

B. $f(x) = \sec(x) - 7x$

C. $f(x) = \frac{|x-4|}{x-4}$

D. $f(x) = \begin{cases} x^2+1, & x \leq -2 \\ -6x-7, & x > -2 \end{cases}$

E. None of these

10. _____ What are the x-values where the function $f(x) = \cot(x) - \csc(x)$ is **discontinuous**?

A. All x-values such that $x = (2n + 1) \cdot \pi$

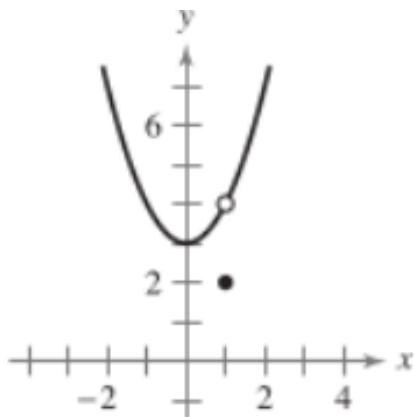
B. All x-values such that $x = (2n + 1) \cdot \frac{\pi}{2}$

C. All x-values such that $x = 2n \cdot \pi$

D. All x-values such that $x = n \cdot \pi$

E. None of these

11. _____ Use the following graph of $f(x)$ to determine the limit: $\lim_{x \rightarrow 1} f(x) = ?$



A. $\lim_{x \rightarrow 1} f(x) = 2$

B. $\lim_{x \rightarrow 1} f(x) = 4$

C. $\lim_{x \rightarrow 1} f(x) = 1$

D. The limit does not exist.

E. None of these

12. _____ Determine which of the following limits DOES NOT EXIST:

A. $\lim_{x \rightarrow \frac{\pi}{2}} \cos x$

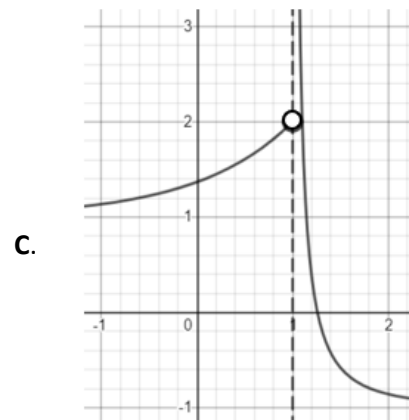
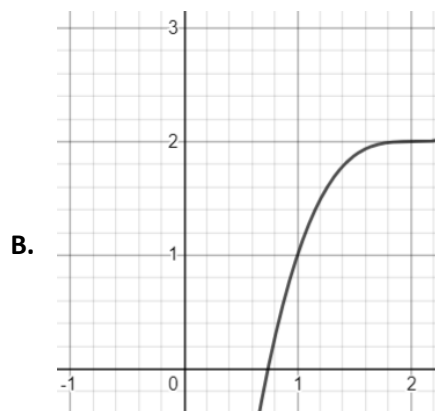
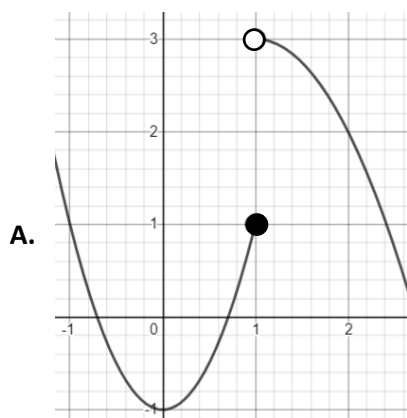
B. $\lim_{x \rightarrow -3} \left(\frac{x+3}{x+6} \right)$

C. $\lim_{x \rightarrow 7} \left(\frac{x^2-49}{x-7} \right)$

D. $\lim_{x \rightarrow 4} \left(\frac{x+9}{4-x} \right)$

E. None of these

13. _____ Which of the following graphs indicates that one-sided limit $\lim_{x \rightarrow 1^+} f(x)$ does **NOT** exist?



D. $\lim_{x \rightarrow 1^+} f(x)$ does not exist for all of these

E. None of these