

$$67. \lim_{x \rightarrow l^-} f(x) = \liminf_{x \rightarrow l} f(x) = f(l)$$

$$\lim_{x \rightarrow l^-} (ae^{x-1} + 3) = \lim_{x \rightarrow l^+} (\arctan(x-1) + 2) = f(l)$$

$$a + 3 = 2$$

$$a = -1$$

$$99.) \quad f(x) = x^2 + x - 1 \quad [0, 5] \quad f(c) = 11$$

$$\begin{aligned}f(0) &= -1 \\f(5) &= 29\end{aligned}$$

$$11 = x^2 + x - 1$$

$$0 = x^2 + x - 12$$

$$0 = (x+4)(x-3)$$

$$x = \cancel{-4}, 3 \quad c = 3$$

Ch 1 Multiple Choice - Review

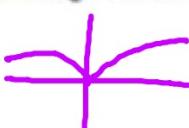
$$1g.) \lim_{x \rightarrow \infty} f(x) = 1$$

$$2f.) \lim_{x \rightarrow 2} \frac{x-2}{\sqrt{x}-\sqrt{4-x}} \cdot \frac{(\sqrt{x}+\sqrt{4-x})}{(\sqrt{x}+\sqrt{4-x})}$$

$$\lim_{x \rightarrow 2} \frac{(x-2)(\sqrt{x}+\sqrt{4-x})}{x - (4-x)} \quad \frac{\cancel{x-2}}{\cancel{2(x-2)}} \cdot \frac{\sqrt{2} + \sqrt{2}}{2} = \sqrt{2}$$

1.

Which of the following functions are continuous for all real numbers x ?

I. $y = x^{\frac{2}{3}}$ 

II. $y = e^x$

III. $y = \tan x$

(A) None

(B) I only

(C) II only

(D) I and II

(E) I and III



2.

$$\lim_{x \rightarrow 0} \frac{5x^4 + 8x^2}{3x^4 - 16x^2} \text{ is}$$

(A) $-\frac{1}{2}$

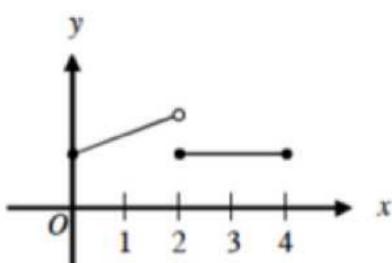
(B) 0

(C) 1

(D) $\frac{5}{3} + 1$

(E) nonexistent

3.



Graph of f

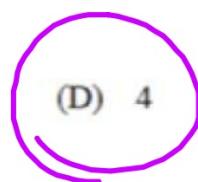
The figure above shows the graph of a function f with domain $0 \leq x \leq 4$. Which of the following statements are true?

- 2- I. $\lim_{x \rightarrow 2^-} f(x)$ exists. ✓
- II. $\lim_{x \rightarrow 2^+} f(x)$ exists. ✓
- III. $\lim_{x \rightarrow 2} f(x)$ exists.
- (A) I only (B) II only (C) I and II only (D) I and III only (E) I, II, and III

4.

$$\lim_{n \rightarrow \infty} \frac{4n^2}{n^2 + 10,000n} \text{ is}$$

- (A) 0 (B) $\frac{1}{2,500}$ (C) 1



- (D) 4 (E) nonexistent

(D) 4

6.

$\lim_{x \rightarrow 0} (x \csc x)$ is

(A) $-\infty$

(B) -1

(C) 0

(D) 1

(E) ∞

$$\lim_{x \rightarrow 0} x \csc x = \lim_{x \rightarrow 0} \frac{x}{\sin x} = 1$$

8.

If $\begin{cases} f(x) = \frac{\sqrt{2x+5} - \sqrt{x+7}}{x-2}, & \text{for } x \neq 2, \\ f(2) = k \end{cases}$ and if f is continuous at $x = 2$, then $k =$

(A) 0

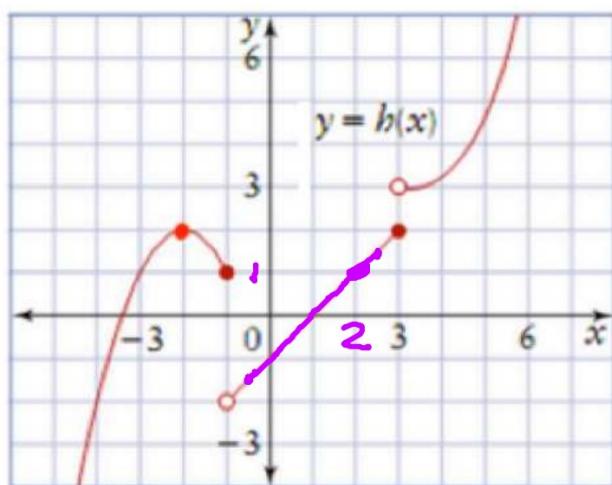
(B) $\frac{1}{6}$

(C) $\frac{1}{3}$

(D) 1

(E) $\frac{7}{5}$

9b.



On the interval $-0.5 \leq x \leq 2.5$, the IVT guarantees a value $-0.5 < j < 2.5$ such that $h(j) = 1$. What is j ?

- (A) 0 (B) 1 (C) 2 (D) 3 (E) the IVT does not apply

10.

The line $y = -7$ is a horizontal asymptote to the graph of which of the following functions?

- (A) $y = -\frac{\sin(7x)}{x}$ (B) $y = \frac{-7x^2 + 2x - 1}{\sqrt{x^2 + 50}}$ (C) $y = \frac{1}{x+7}$ (D) $y = \frac{21x^3 - 2x^2 - 7}{7 + 9x - 3x^3}$ (E) $y = \frac{-7x}{1-x}$

11.

$$\lim_{x \rightarrow 6} \frac{1 - \sqrt{x-5}}{x(x-6)} =$$

(A) $-\frac{1}{2}$ (B) $-\frac{1}{12}$ (C) $\frac{1}{2}$ (D) $\frac{1}{12}$ (E) $-\frac{1}{6}$

15.

A function $f(x)$ is continuous for all x . The function satisfies

$$f(1) = 10, f(2) = 3, f(3) = -5, \text{ and } f(4) = -18$$

The IVT says that the equation

- (A) $f(x) = 8.675309$ has a solution for some $x \in (1, 2)$.
- (B) $f(x) = 8.675309$ has a solution for some $x \in (2, 3)$.
- (C) $f(x) = 8.675309$ has a solution for some $x \in (3, 4)$.
- (D) $f(x) = 8.675309$ has a solution for some x with $x < -18$.
- (E) It cannot be determined from the information whether $f(x) = 8.675309$ has a solution.

