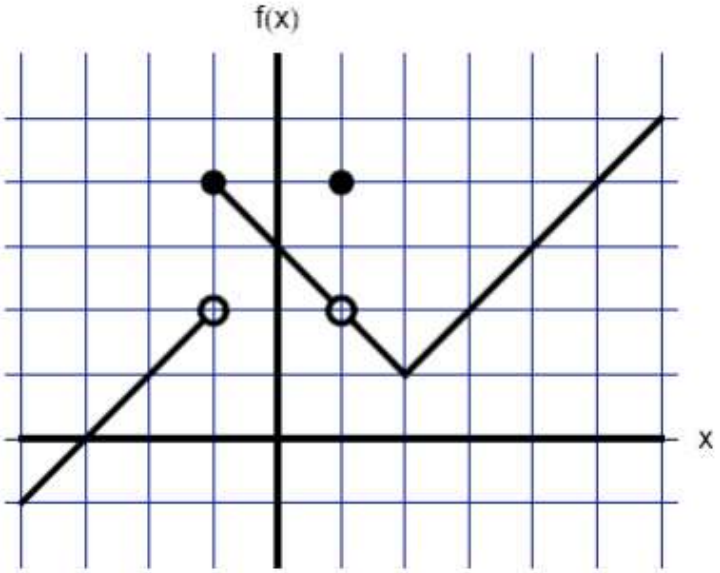
My Chapter One AP Collection ***[Non-calculator]***



1. The graph of a function f whose domain is the closed interval $[-4, 6]$ is shown *above*. Which of the following statements about $f(x)$ is true?

(A) $\lim_{x \to -1} f(x) = 4$

(B) $\lim_{x \to -1} f(x) = 2$

(C) $f(x)$ is continuous at $x = -1$

(D) $f(x)$ is continuous at $x = 1$

(E) $\lim_{x \to 2} f(x) = f(2)$

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2. $\lim_{\theta \to 0} \dfrac{1 - \cos\theta}{2\sin^2\theta} =$

(A) Does not exist (B) 0 (C) 1

(D) $\frac{1}{4}$ (E) $\frac{1}{8}$

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3.

The functions f and g are continuous. The continuous function h is given by $h(x) = f(g(x)) - x$. The table below gives values of the functions. Explain why there must be a value t for $1 < t < 4$ such that $h(t) = -1$.

x	1	2	3	4
$f(x)$	0	8	-3	6
$g(x)$	3	4	1	2

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4. $\lim_{x \to 25} \dfrac{x-25}{5-\sqrt{x}} =$

(A) Does not exist (B) 0 (C) -10

(D) 10 (E) $\dfrac{1}{10}$

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5. Let f be the function given by $f(x) = \dfrac{(x-1)(x^2-4)}{x^2-a}$. For what positive values of a is f continuous for all real numbers x?

(A) 1 and 4 (B) 1 only (C) 2 only

(D) 4 only (E) None

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6. $$f(x) = \begin{cases} lnx & for\ 0 \le x \le 5 \\ (ln5)\,x^2 & for\ 5 < x \le 10 \end{cases}$$

Then $\lim_{x \to 5} f(x) =$

(A) $\ln 5$ (B) $\ln 10$ (C) $\ln 25$ (D) $25 \ln 5$ (E) does not exist

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7. $\lim_{x \to e} \ln x^3 =$

(A) e (B) $3e$ (C) 1 (D) 3 (E) 0

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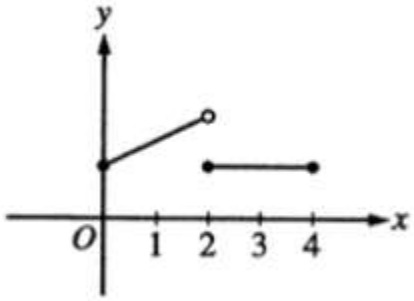
8.



Graph of f

The graph of a function f is shown above. The domain of f is $0 \le x \le 4$. Which of the following statements about f is/are true?

I. $\lim_{x \to 2^-} f(x)$ exist

II. $f(2)$ exists

III. $\lim_{x \to 2} f(x)$ exists

(A) I, II, and III (B) I and II only (C) I and III only

(D) II and III only (E) II only

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9. $\lim_{x \to \pi} \cot x =$

(A) 0 (B) 1 (C) $\frac{\sqrt{2}}{2}$

(D) -1 (E) Does not exist

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10. Let h be a function that is continuous on the closed interval [10, 25] with $h(10)=3$ and $h(25)=5$. Which of the following must be true about the graph of h?

(A) $h(x)$ has at least one zero on the open interval $10 < x < 25$

(B) 5 is the maximum value of h on the closed interval $10 \le x \le 25$

(C) $h(c)=4$ for some $c, 10<c<25$

(D) 3 is the minimum value of h on the closed interval $10 \le x \le 25$

(E) h is a linear function

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11.

$f(x)$ and $g(x)$ are continuous functions for all $x \in$ Reals. The table below has values for the functions for selected values of x. The function $h(x)=g(f(x))+2$

x	$f(x)$	$g(x)$
1	3	4
3	9	-10
5	7	5
7	11	25

Explain why there must be a value c for $1<c<5$ such that $h(c)=0$.

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See also the Test Prep questions at the end of Chapter One in our textbook.