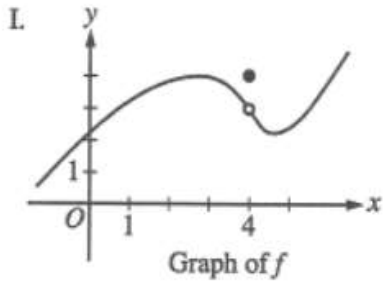
Limits (No Calculator)

2003 #79

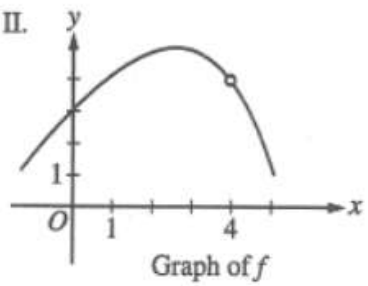
For which of the following does $\lim_{x \to 4} f(x)$ exist?

I.



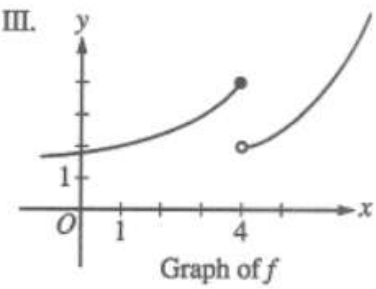
Graph of f

II.



Graph of f

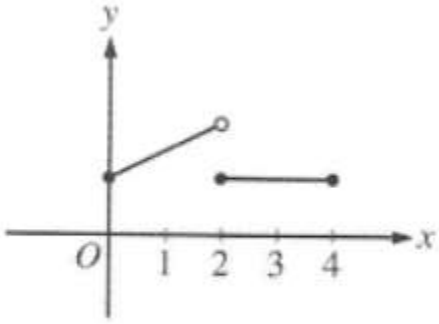
III.



Graph of f

(A) I only
(B) II only
(C) III only
(D) I and II only
(E) I and III only

2008 #77



Graph of f

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

I. $\lim_{x \to 2^-} f(x)$ exists.
II. $\lim_{x \to 2^+} f(x)$ exists.
III. $\lim_{x \to 2} f(x)$ exists.

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

2008 #5, part 1

$\lim_{x\to 0}\dfrac{5x^4+8x^2}{3x^4-16x^2}$ is

(A) $-\dfrac{1}{2}$ (B) 0 (C) -1 (D) $\dfrac{5}{3}$ (E) nonexistent

2008 #5, part 2

$\lim_{x\to \infty}\dfrac{5x^4+8x^2}{3x^4-16x^2}$ is

(A) $-\dfrac{1}{2}$ (B) 0 (C) -1 (D) $\dfrac{5}{3}$ (E) nonexistent

2008 #5, part 3

$\lim_{x\to 1}\dfrac{5x^4+8x^2}{3x^4-16x^2}$ is

(A) $-\dfrac{1}{2}$ (B) 0 (C) -1 (D) $\dfrac{5}{3}$ (E) nonexistent

2008 #1

$\lim_{x\to \infty}\dfrac{(2x-1)(3-x)}{(x-1)(x+3)}$ is

(A) -3 (B) -2 (C) 2 (D) 3 (E) nonexistent

2008 #19

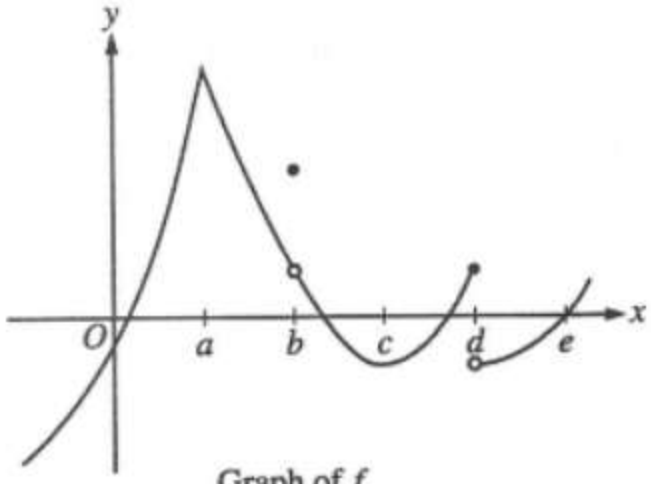
What are all horizontal asymptotes of the graph of $y=\dfrac{5+2^x}{1-2^x}$ in the *xy*-plane?

(A) y = -1 only
(B) y = 0 only
(C) y = 5 only
(D) y = -1 and y = 0
(E) y = -1 and y = 5

2003 #3

For $x \geq 0$, the horizontal line $y = 2$ is an asymptote for the graph of the function f. Which of the following statements must be true?

(A) $f(0) = 2$
(B) $f(x) \neq 2$ for all $x \geq 0$
(C) $f(2)$ is undefined.
(D) $\lim_{x \to 2} f(x) = \infty$
(E) $\lim_{x \to \infty} f(x) = 2$



Graph of f

2003 #13

The graph of a function f is shown above. At which value of x is f continuous, but not differentiable?

(A) a (B) b (C) c (D) d (E) e

2003 #20

$$f(x) = \begin{cases} x + 2 & \text{if } x \leq 3 \\ 4x - 7 & \text{if } x > 3 \end{cases}$$

Let f be the function given above. Which of the following statements are true about f?

I. $\lim_{x \to 3} f(x)$ exists.
II. f is continuous at $x = 3$.
III. f is differentiable at $x = 3$.

(A) None (B) I only (C) II only (D) I and II only (E) I, II and III

2008 #6

$$f(x)=\begin{cases}\dfrac{x^2-4}{x-2} & \text{if } x\neq 2\\ 1 & \text{if } x=2\end{cases}$$

Let f be the function defined above. Which of the following statements about f are true?

I. f has a limit at $x = 2$.
II. f is continuous at $x = 2$.
III. f is differentiable at $x = 2$.

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

Last Question

$\lim\limits_{x\to 0}\dfrac{\sin x\cos x}{x}$ is

(A) -1 (B) 0 (C) 1 (D) $\dfrac{\pi}{4}$ (E) nonexistent