

# AP REVIEW SESSION 1

## Limits & Continuity

- Limits
- Asymptotic Behavior
- Definition of Continuity
- Types of Discontinuity
  - IVT

### Non-Calc

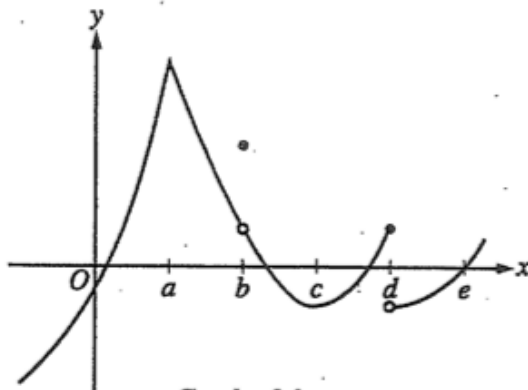
2003

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)  $\lim_{x \rightarrow 2} f(x) = \infty$
- (E)  $\lim_{x \rightarrow \infty} f(x) = 2$

6.  $\lim_{x \rightarrow \infty} \frac{x^3 - 2x^2 + 3x - 4}{4x^3 - 3x^2 + 2x - 1} =$

- (A) 4      (B) 1      (C)  $\frac{1}{4}$       (D) 0      (E) -1



Graph of  $f$

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)  $e$

2008

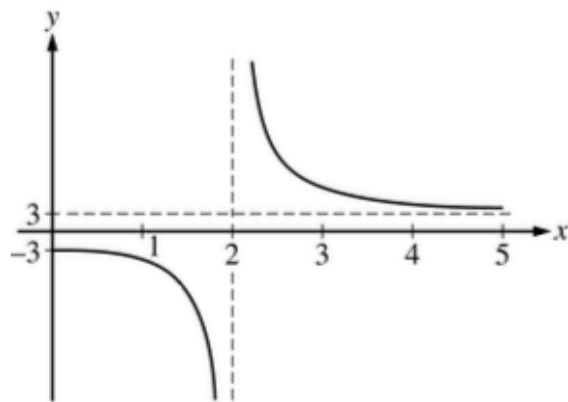
2.  $\lim_{x \rightarrow 0} \frac{2x^6 + 6x^3}{4x^5 + 3x^3}$  is

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

$$f(x) = \begin{cases} x^2 - 3x + 9 & \text{for } x \leq 2 \\ kx + 1 & \text{for } x > 2 \end{cases}$$

3. The function  $f$  is defined above. For what value of  $k$ , if any, is  $f$  continuous at  $x = 2$ ?

- (A) 1  
(B) 2  
(C) 3  
(D) 7  
(E) No value of  $k$  will make  $f$  continuous at  $x = 2$ .



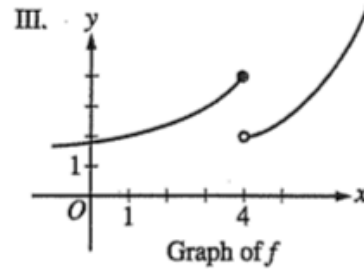
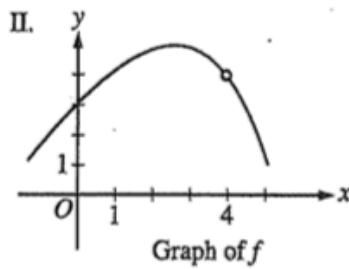
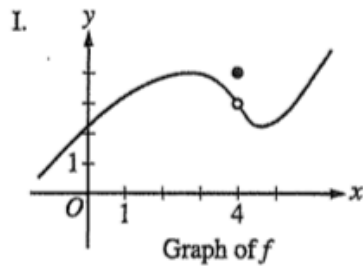
10. The function  $f$  is given by  $f(x) = \frac{ax^2 + 12}{x^2 + b}$ . The figure above shows a portion of the graph of  $f$ . Which of the following could be the values of the constants  $a$  and  $b$ ?

- (A)  $a = -3$ ,  $b = 2$   
(B)  $a = 2$ ,  $b = -3$   
(C)  $a = 2$ ,  $b = -2$   
(D)  $a = 3$ ,  $b = -4$   
(E)  $a = 3$ ,  $b = 4$

Calculator Allowed

2003

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



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