

## 1988 AP Calculus AB: Section I

## 90 Minutes—No Calculator

Notes: (1) In this examination,  $\ln x$  denotes the natural logarithm of  $x$  (that is, logarithm to the base  $e$ ).

(2) Unless otherwise specified, the domain of a function  $f$  is assumed to be the set of all real numbers  $x$  for which  $f(x)$  is a real number.

①. If  $y = x^2 e^x$ , then  $\frac{dy}{dx} =$

- (A)  $2xe^x$                       (B)  $x(x + 2e^x)$                       (C)  $xe^x(x + 2)$   
 (D)  $2x + e^x$                       (E)  $2x + e$

2. What is the domain of the function  $f$  given by  $f(x) = \frac{\sqrt{x^2 - 4}}{x - 3}$ ?

- (A)  $\{x: x \neq 3\}$                       (B)  $\{x: |x| \leq 2\}$                       (C)  $\{x: |x| \geq 2\}$   
 (D)  $\{x: |x| \geq 2 \text{ and } x \neq 3\}$                       (E)  $\{x: x \geq 2 \text{ and } x \neq 3\}$

→ 3. A particle with velocity at any time  $t$  given by  $v(t) = e^t$  moves in a straight line. How far does the particle move from  $t = 0$  to  $t = 2$ ?

- (A)  $e^2 - 1$                       (B)  $e - 1$                       (C)  $2e$                       (D)  $e^2$                       (E)  $\frac{e^3}{3}$

④. The graph of  $y = \frac{-5}{x-2}$  is concave downward for all values of  $x$  such that

- (A)  $x < 0$                       (B)  $x < 2$                       (C)  $x < 5$                       (D)  $x > 0$                       (E)  $x > 2$

⑤.  $\int \sec^2 x \, dx =$

- (A)  $\tan x + C$                       (B)  $\csc^2 x + C$                       (C)  $\cos^2 x + C$   
 (D)  $\frac{\sec^3 x}{3} + C$                       (E)  $2\sec^2 x \tan x + C$