- A relative maximum of the function  $f(x) = \frac{(\ln x)^2}{x}$  occurs at 5.
  - (A) 0
  - (B) 1
  - (C) 2
  - (D) e
  - (E)  $e^2$

22. Let  $f(x) = x \ln x$ . The minimum value attained by f is

- $(A) \frac{1}{e}$
- (B) 0
- (C)  $\frac{1}{e}$
- (D) -1
- (E) There is no minimum.

- Find the coordinates of the absolute maximum point for the curve  $y = xe^{-kx}$  where k is a fixed positive number. (A)  $\left(\frac{1}{k}, \frac{1}{ke}\right)$  (B)  $\left(\frac{-1}{k}, \frac{-e}{k}\right)$  (C)  $\left(\frac{1}{k}, \frac{1}{e^k}\right)$  (D) (0, 0) (E) there is no maximum

- 6. Consider the function  $f(x) = \frac{x^4}{2} \frac{x^5}{10}$ . The derivative of f attains its maximum value at  $x = \frac{x^4}{2} \frac{x^5}{10}$ .
  - (A) 3
  - (B) 4
  - (C) 5
  - (D) 0
  - (E) there is no maximum

15. Find the maximum value of  $f(x) = 2x^3 + 3x^2 - 12x + 4$  on the closed interval [0,2].

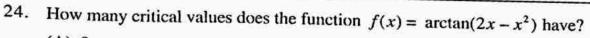
(A) -3

(B) 2

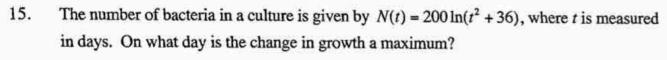
(C) 4

(D) 8

(E) 24



- (A) 0
- (B) 1
- (C) 2
- (D) 3
- (E) 4



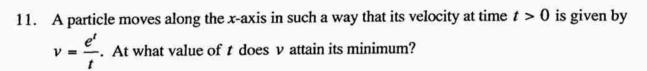
(A) 4

(B) 6

(C) 8

(D) 10

(E) 12



- (A) 0
- (B) 1
- (C) e
- (D) -1
- (E) There is no minimum value of v.

3.	The sale of lumber $S$ (in millions of square feet) for the years 1980 to 1990 is modeled by the function
	$S(t) = 0.46\cos(0.45t + 3.15) + 3.4$
	where $t$ is the time in years with $t = 0$ corresponding to the beginning of 1980. Determine the year when lumber sales were increasing at the greatest rate.
	(A) 1982
	(B) 1983
	(C) 1984
	(D) 1985
	(E) 1986
	Ans

6. The minimum distance from the origin to the curve  $y = e^x$  is
(A) 0.72 (B) 0.74 (C) 0.76 (D) 0.78 (E) 0.80

20. The maximum distance, measured horizontally, between the graphs of f(x) = x and  $g(x) = x^2$  for  $0 \le x \le 1$ , is

(A) 1

(B)  $\frac{3}{4}$  (C)  $\frac{1}{2}$  (D)  $\frac{1}{4}$ 

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