

Chapter-11 Section-A

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- 1) Evaluate $\lim_{x \rightarrow a} \frac{\sqrt{a+2x} - \sqrt{3x}}{\sqrt{3a+x} - 2\sqrt{x}}, (a \neq 0)$ (1978)
- 2) $f(x)$ is the integral of $\frac{2 \sin x \sin 2x}{x^3}, x \neq 0$, find $\lim_{x \rightarrow 0} f'(x)$ (1979)
- 3) Evaluate:
 $\lim_{h \rightarrow 0} \frac{(a+h)^2 \sin(a+h) - a^2 \sin a}{h}$ (1980)
- 4) Let $f(x+y) = f(x) + f(y)$ for all x and y .
 If the function $f(x)$ is continuous at $x = 0$, then show that $f(x)$ is continuous at all x . (1981 - 2Marks)
- 5) Use the formula $\lim_{x \rightarrow 0} \frac{a^x - 1}{x} = \ln a$ to find $\lim_{x \rightarrow 0} \frac{2^x - 1}{(1+x)^{\frac{1}{2}} - 1}$ (1982 - 2 Marks)
- 6) Let $f(x) = \begin{cases} 1+x & 0 \leq x \leq 2 \\ 3-x & 2 \leq x \leq 3 \end{cases}$
 Determine the form of $g(x) = f(x)$ and hence find the points of discontinuity of g , if any (1983 - 2 Marks)
- 7) Let $f(x) = \begin{cases} \frac{x^2}{2} & , 0 \leq x \leq 1 \\ 2x^2 - 3x + \frac{3}{2} & , 1 \leq x \leq 2 \end{cases}$
 Discuss the continuity of f, f' and f'' on $[0, 2]$. (1983 - 2 Marks)
- 8) Let $f(x) = x^3 - x^2 + x + 1$ and $g(x) = \begin{cases} \max f(t); 0 \leq t \leq 1 \\ 3 - x & 0 \leq t \leq 2 \end{cases}$ Discuss the continuity and differentiability of the function $g(x)$ in the interval $(0, 2)$ (1985 - 5 Marks)
- 9) Let $f(x)$ be defined in the interval $[-2, 2]$ such that $f(x) = \begin{cases} -1, -2 \leq x \leq 0 \\ x-1, 0 < x \leq 2 \end{cases}$ and $g(x) = f(|x|) + |f(x)|$ Test the differentiability of $g(x)$ in $(-2, 2)$. (1986 - 5 Marks)
- 10) Let $f(x)$ be a continuous and $g(x)$ be a discontinuous function. Prove that $f(x) + g(x)$ is a discontinuous function. (1987 - 2Marks)