Assignment-2

AI24BTECH11019-PRATHEEK

A.Fill in the blanks

1) If $y=f\left(\frac{2x+1}{x^2+1}\right)$ and $f'(x)=sinx^2$, then $\frac{dy}{dx}=\ldots\ldots$ $(1982-2Marks)$
2) If $f_r(x)$,$g_r(x)$,$h_r(x)$, $r=1,2,3$ are polynomials in x such that $f_r(a)$=$g_r(a)$=$h_r(a)$,$r=1,2,3$ and $F(x)=\begin{vmatrix} f_1(x) & f_2(x) & f_3(x) \\ g_1(x) & g_2(x) & g_3(x) \\ h_1(x) & h_2(x) & h_3(x) \end{vmatrix}$ then $F'(x)$ at $x=a$ is $\ldots\ldots$ $(1985-2Marks)$
3) If $f(x)=\log_x(\ln x)$,then $f'(x)$ at $x=e$ is$\ldots\ldots$ $(1982-2Marks)$
4) The derivative of $\sec^{-1}\left(\frac{1}{2x^2-1}\right)$ with respect to $\sqrt{1-x^2}$ at $x=\frac{1}{e}$ is $\ldots\ldots$ $(1986-2Marks)$
5) If $f(x)=|x-2|$ and $g(x)=f[f(x)]$,then $g'(x)=\ldots\ldots$for $x>20$ $(1990-2Marks)$
6) if $xe^{xy}=y+\sin^2 x$,then at $x=0$, $\frac{dy}{dx}=\ldots\ldots$
   . $(1992-1Mark)$

B.TRUE/FALSE

1) The derivative of an even function is always an odd function $(1983-1Mark)$

C.MCQs with One Correct Answer

1) If $y=P(x)$, a polynomial of degree 3,then $2\frac{d}{dx}\left(y^3\frac{d^2y}{dx^2}\right)$ equals $(1988-2Marks)$

   a) $P''(x)+P'(x)$
   b) $P'(x)P''(x)$
   c) $P(x)P''(x)$
   d) a constant

2) Let $f(x)$ be a qaudratic expression which is positive for all the real values of x. If $g(x)=f(x)+f'(x)+f''(x)$,then for any real x,

   a) $g(x)<0$
   b) $g(x)>0$
   c) $g(x)=0$
   d) $g(x)\geq 0$

3) If $y=(\sin x)^{\tan x}$ then $\frac{dy}{dx}$ is equal to
   . (1994)
   a) $(\sin x)^{\tan x}\left(1+\sec^2\log\sin x\right)$
   b) $\tan x(\sin x)^{\tan x-1}.\cos x$
   c) $(\sin x)^{\tan x}\sec^2\log\sin x$
   d) $\tan x(\sin x)^{\tan x-1}$
4) If $x^2+y^2=1$ then (2000)

   a) $yy''-2(y')^2+1=0$
   b) $yy''+(y')^2+1=0$
   c) $yy''-(y')^2+1=0$
   d) $yy''+2(y')^2+1=0$

5) Let $f(x):(0,\infty)\to\mathbb{R}$ and $F(x)=\int_0^x f(t)\,dt$.If $F(x^2)=x^2(1+x)$, then $f(4)$ equals $(2001S)$

a) $\frac{5}{4}$ b) 7 c) 4 d) 2

6) If y is a function of x and $\log(x + y) - 2xy = 0$,then the value of $y'(0)$ is equal to (2004S)

a) 1 b) -1 c) 2 d) 0