SELF ASSESSMENT TEST -4

CLASS B.A,B.SC-1

SUCCESSIVE DIFFERENTIATION

1. Prove that $\frac{d^n}{dx^n}\left(\frac{\log x}{x}\right)=\frac{(-1)^n n1}{x^{n+1}}\left[\log x-1-\frac{1}{2}-\frac{1}{3}.....\frac{1}{n}\right]$.
2. Find the nth derivative if y = $\frac{2x+1}{(x-2)(x-3)}$.
3. Find the nth derivative of $\sin^2 x\cos^3 x$
4. Find the nth derivative of $\frac{1}{x^2+a^2}$ if $\theta=\cot^{-1}\frac{x}{a}$.
5. State and prove Leibnitz's thm.
6. Find the value of the nth derivative of $e^{m\cos^{-1}x}$ at x=0.
7. If f(x)= tanx , prove that

   $f^n(0)-C(n;2)\,f^{n-2}(0)+C(n,4)\,f^{n-4}(0)-.....=\sin\frac{n\pi}{2}$.
8. If y = $\sin\left(m\sin^{-1}x\right)$ prove that $\left(1-x^2\right)y_{n+2}-(2n+1)x\,y_{n+1}-\left(n^2-m^2\right)y_n=0$

   deduce that $y_n(0)=\begin{cases}0 & n\ \ even\\ m\left(1^2-m^2\right)\left(3^2-m^2\right).....\left((n-2)^2-m^2\right) & n\ \ odd\end{cases}$.
9. Use Leibnitz's thm find the nth derivative of $e^x\log x$

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