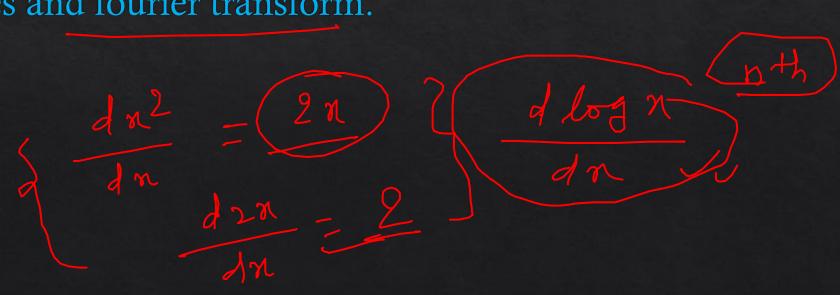
ENGINEERING MATHEMATICS-I

SYLLABUS

- *** UNIT-1**
- univariate calculus.
- ❖ Unit -2
- multivariate calculus.
- Unit-3
- vector calculus.
- Unit-4
 - complex number.
- Unit-5

fourier series and fourier transform.

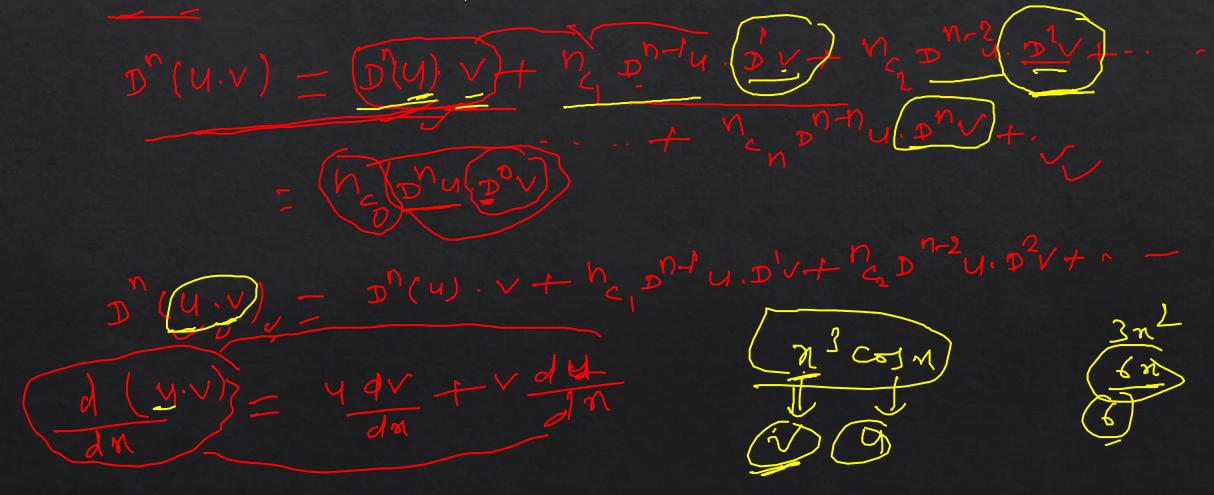




Leibnitz's theorem:-

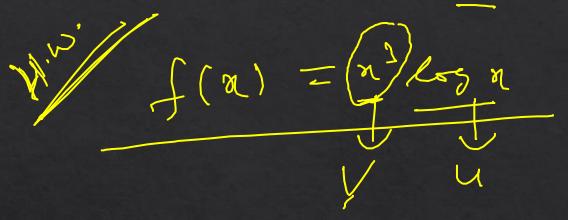
= the n'th differential coefficient of the product of two functions is conventially. Evaluated by the use of this theorem, its statement is:-

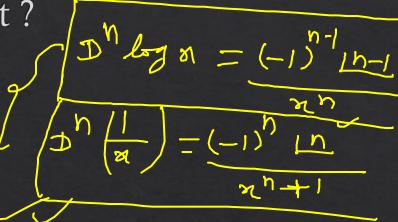
Theorem:- if u and v are two functions of x, then



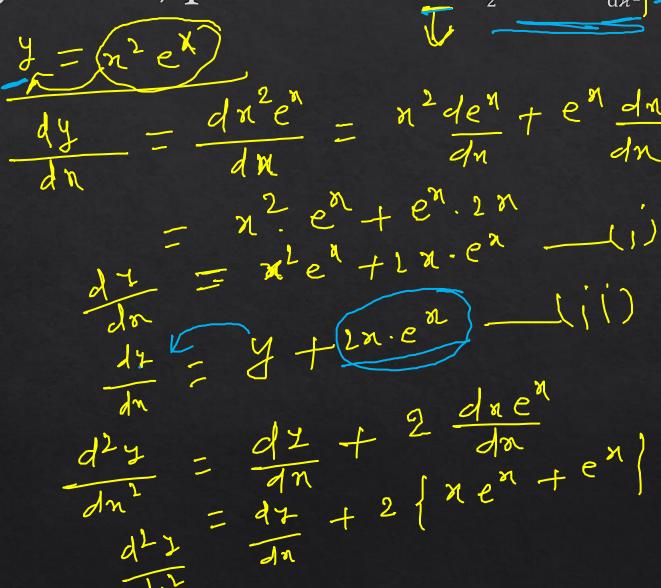
Q. x³cosx, find n'th differential coefficient? $\frac{(n-1)^n}{(n-1)^n} \frac{n(n^3 \cos n)}{(n-1)^n} = \frac{D^n \cos n \cdot (\frac{3}{2})}{(n-1)^n} + \frac{(h)}{(h)} \frac{n-1}{(h-1)^n} \cos n \cdot \frac{1}{2} \frac{1}{n-1} \cos n \cdot \frac{1}{2} \cos n \cdot \frac$ + nc 2 Du-3 cos n. D3 213+- $- \left(\frac{1}{2} \right) + \frac{1}{2} \left($ · 6x + n (n-1)(n-2) (x (n+ (n-3) x) -67 L4 = 4 x3x2x1

Q. $f(x) = x^3 \log x$, then find the n'th differential coefficient?





Q. $y=x^2e^x$, prove that $y_n = \frac{1}{2}n(n-1)\frac{d^2y}{dx^2} - n(n-2)\frac{dy}{dx} + \frac{1}{2}(n-1)(n-2)y$.



$$\frac{d^{2}y}{dn^{2}} = \frac{dy}{dn} + \frac{2ne^{4} + 2e^{4}}{dn}$$

$$\frac{d^{2}y}{dn^{2}} = \frac{dy}{dn} + \frac{dy}{dn} - \frac{y + 2e^{4}}{dn}$$

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$$\frac{1}{2} = \frac{1}{2} \frac$$

$$\frac{1}{2} \frac{1}{n} = \frac{h(n-1)}{2} \frac{d^{2}y}{dn^{2}} + h(n-2) \frac{dy}{dn} + y(f-1)(h-1)f$$

$$\frac{1}{2} \frac{1}{n} = \frac{h(n-1)}{2} \frac{d^{2}y}{dn^{2}} - h(n-2) \frac{dy}{dn} + \frac{1(h-1)(h-1)}{2} \frac{1}{n}$$

$$\frac{1}{2} \frac{1}{n} = \frac{h(n-1)}{2} \frac{d^{2}y}{dn^{2}} - h(n-2) \frac{dy}{dn} + \frac{1(h-1)(h-1)}{2} \frac{1}{n}$$

Proved

* maclaurin's theorem:-//

= if f(x) is a function of x such that it can be expanded in accending power of x. and this expansion be differentiable any no. of times, then

$$F(x) = f(0) + x/1!f'(0) + x^2/2!f''(0) + \dots$$

Q.
$$f(x) = e^{x}$$

$$f(x) = e^{x}$$

$$f(0) = e^{0} = 1$$

$$f'(0) = e^{0} = 1$$

$$f''(0) = e^{0} = 1$$

$$f''(0) = e^{0} = 1$$

$$f'''(0) = e^{0} = 1$$

$$f''''(0) = e^{0} = 1$$

Taylor's theorem:-

dlog sin xd sin = 1 xcos x

= if f(a+h) [where a is independent of h] be a function of this variable h. such that it can be expanded in accending power of h and this expansion be differentiable of any no. of times, then

$$F(a+h) = f(a)+f'(a).h^{1/2}/1! + f''(a) h^{1/2}/2! + f'''(a) h^{1/2}/3! + \dots$$

Q.
$$f(x)=log(sin x)$$
, in power of $(x-2)$

$$f(x) = log(sin x)$$

$$\operatorname{er of}(x-2)$$

f'(n): Cet d $f'(n) = Cesec^2 d$ $f''(n) = -Cesec^2 d$ $f''(n) = -cesec^2 d$ $f'''(n) = -cesec^2 d$ $f'''(n) = -cesec^2 d$ $f''''(n) = -cesec^2 d$ $f''''(n) = -cesec^2 d$

f(n)=f(x)+f'(n).h'+f''(x).h' f(n) - log sinn f(2) - leg Sin 2 f(2+n-2) = log sin 2 + Cot 2 (21-2) f (x) - Cot n f(2) = C+2 (21-2) f'(n) = - Cosec2n $f''(2) = -(43ec^2 2)$ イ $f^{111}(x) = 2 \text{ Cose } (2x, \text{ Cot} x)$ $f^{111}(x) = 2 \text{ Cose } (2x, \text{ Cot} x)$



THANK YOU