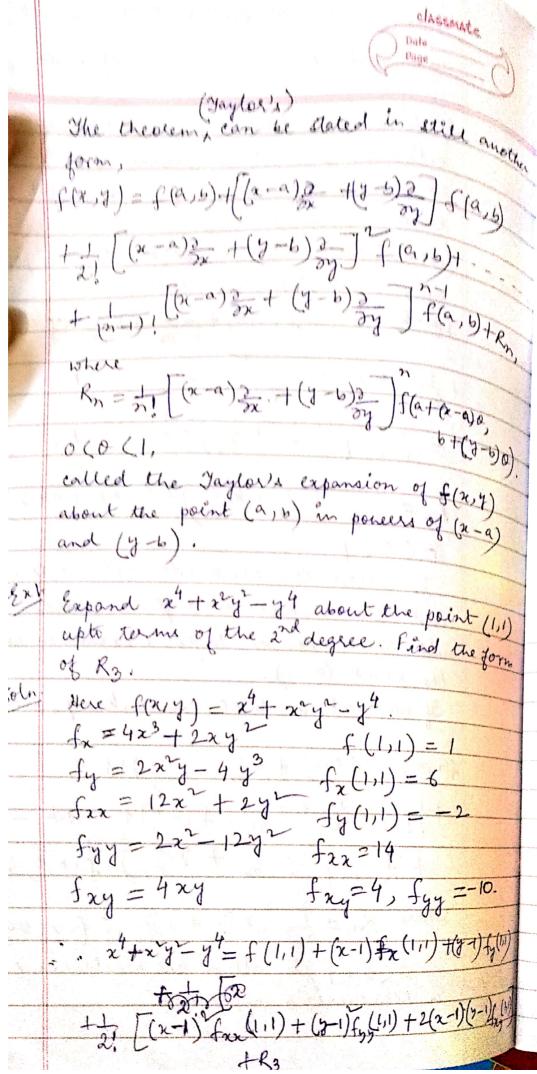
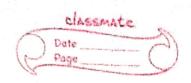
BSC-M302 (CSE & IT) charante Hayler's 2 Maclaurin's expansion of f(x,y) is a function which possesses continuous partial decivatives of order n In any domain of a point (a, b) and the domain is large enough to contain a point (ath, btk) within it, then its I a positive no., OCO XI, such that fath, btk) = f(a,b) + (h2+k2) f(a,b) + 1 (h 3 + k3 ) 8(a, b) + -- + -+ (n-1) ( (h 3x + k2 ) f(a, b) + Rn, where  $K_{n} = \frac{1}{2\pi i} \left( h \frac{\partial}{\partial x} + k \frac{\partial}{\partial y} \right) f(a + o h, b + o k)$ 06061 is called the remainder after n terms and the theorem is Taylor's theorem with remainder or Taylor's expansion about the point (a, b). of nee put a=6=0; h=x, k=y, we get f(2,7) = f(0,0) + (2 = + 7 = ) f(0,0) + 1 (x 3x + y 2 ) f (0,0) + - + + = -+ (n-1)! (x = + + + = ) n f(0,0) + Rm, where  $R_n = \frac{1}{n!} \left(x \frac{2}{2x} + 7 \frac{2}{2y}\right) f\left(ox, oy\right)$ , 0 (0 (1, is called the Maelaurin's the or Maclaurin's expansion



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$$=1+6(x-1)-2-(y-1)+1-(x-1)-14+(y-1)-(-10)$$

$$+2(x-1)(y-1)\cdot 4+R_3$$

where  $R_3 = \frac{1}{3!} \left[ (x-1) \frac{2}{2x} + (y-1) \frac{2}{2y} \right] f(1+(x-1)0)$ 06061

42 Expand 2 y + 3y-2 in poneers of (2-1) & (4+2)

soln f(x,y) = x y + 3 y -2

fx = 2xy) fy = x +3, f = 24, fy = 0,

 $f_{xy} = 2x$ ,  $f_{xxx}^{-0}$ ,  $f_{xyx}^{-0}$ ,  $f_{xxx}^{-2}$ ,  $f_{yyx}^{-0}$ ,  $f_{yxx}^{-2}$ ,  $f_{yyx}^{-0}$ ,  $f_{yyx}^{-1}$ , f(1,72) = (1xe) + (3x(2) - 2 - 6 - 6)

 $f(1,-2) = 1^{2} \times (-2) + 3 \times (-2) - 2 = -10$ 

200 , fx(1,-2) = -4, fy(1,-2)=4

 $f_{xy}(1,-2) = -4$ ,  $f_{xy}(1,-2) = 2$ ,  $f_{yy} = 0$ 

 $-1. x^{2}y + 3y - 2 = f(1, -2) + (x - 1)(-4)$ 

 $+ (3+2).(4) + \frac{1}{2}, [(2-1).(-4) + (3+2).(0) + \frac{1}{2}, (2-1)(3+2).(0) + \frac{1}{2}, (2-1)(3+2).(0)$  $=-10-4(2-1)+4(3+2)-2(2-1)^{2}+2(2-1)(3+2)$ 

+ (2-1) (5+2). Am

Ex3	Find the first 4 terms of the
	Find the first 4 terms of the Marion of excosby.  Here $f(x,y) = e^{ax} \cosh y$ .
70	there $f(x,y) = e^{-\cos hy}$
tang tang tang	$f_2 = a e^{(0,0)} = e^{(0,0)} = a$
	f = -b 2
the first particular in the contract of the co	$f_y = -be^{ax}$ $f_y = -be^{ax}$ $f_y(0,0) = 0$
	$f_{xx} = a^{2}e^{ax}\cos \theta $ , $f_{xx}(0,0) = a^{2}$
	fyy = -62 eax cosby, fyy(0,0) = -62
	$f_{xy} = -abe^{ax} sinby, f_{xy}(0,0) = 0.$ $f_{xxx} = a^3 e^{ax} cosby, f_{xxx}(0,0) = a^3 a^3$
No. of the contract of the con	$f_{xxx} = a^3 e^{ax} \cos by, f_{xxx}(0,0) = a^3 a^3$
4	$yyy = 6^3 e^3 e^{3} e^{3} + (0.0) = 0$
Commission Commission	$f_{xyy} = -ab^2 e^{2x} \cos by, f_{xyy}(0,0) = -ab^2$
	$yyy = b^3e^3x$ $xyy(0,0) = 0$ . $fxyy = -ab^2e^2x$ $fxyy(0,0) = -ab^2$ $fxyy = -a^3b^2e^2x$ $fxy(0,0) = 0$ .
Commence of the Commence of th	$f(x,y) = f(0,0) + (x \frac{\partial}{\partial x} + y \frac{\partial}{\partial y}) f(0,0)$
+	1. (22 + y 2) 2 f(0,0) + 1 (22 + y 2) for
	$+ax + ax - by + a3x^3 + 3x^2y \cdot 0 - 3xy^2 + 31$
	- Ans