

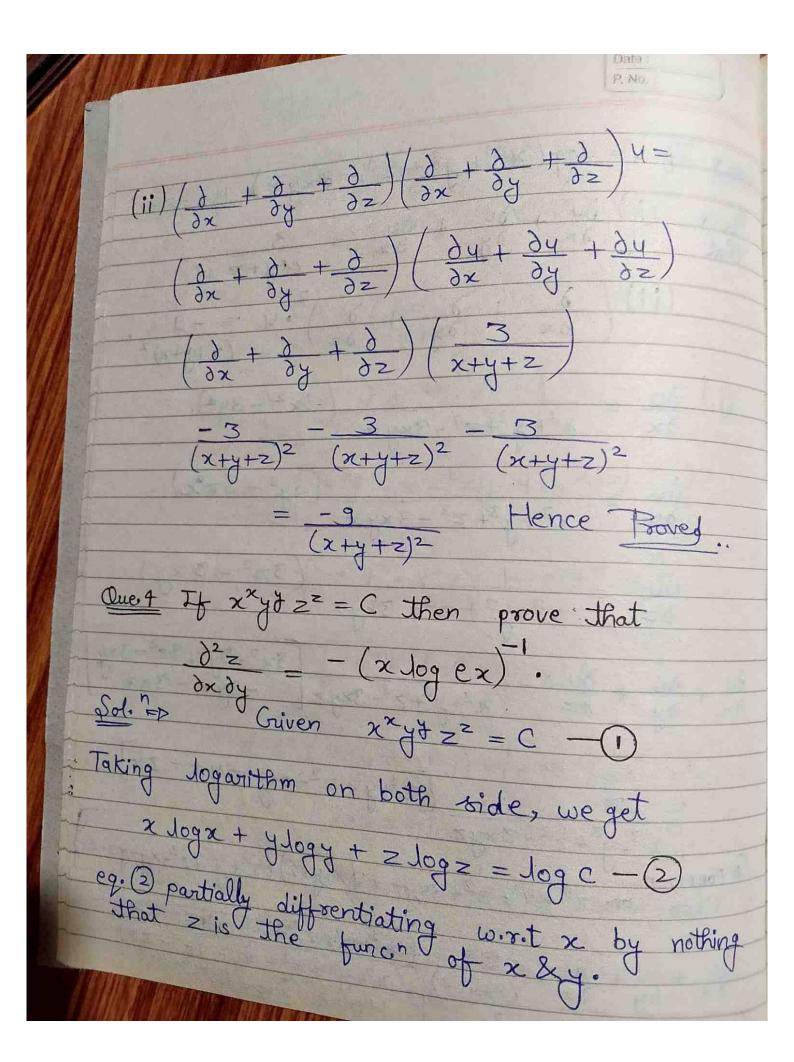
Goe 3 If
$$u = \log(x^3 + y^3 + z^3 - 3xyz)$$

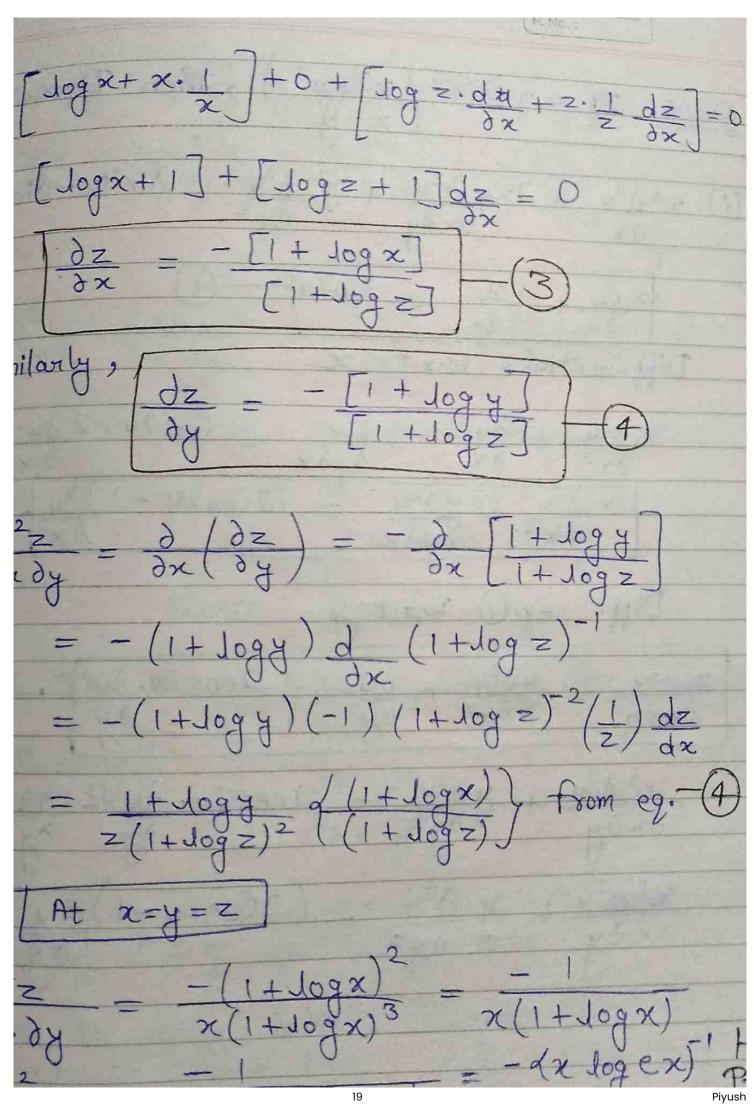
Rove (i) $\frac{\partial u}{\partial x} + \frac{\partial v}{\partial y} + \frac{\partial u}{\partial z} = \frac{3}{x+y+z}$

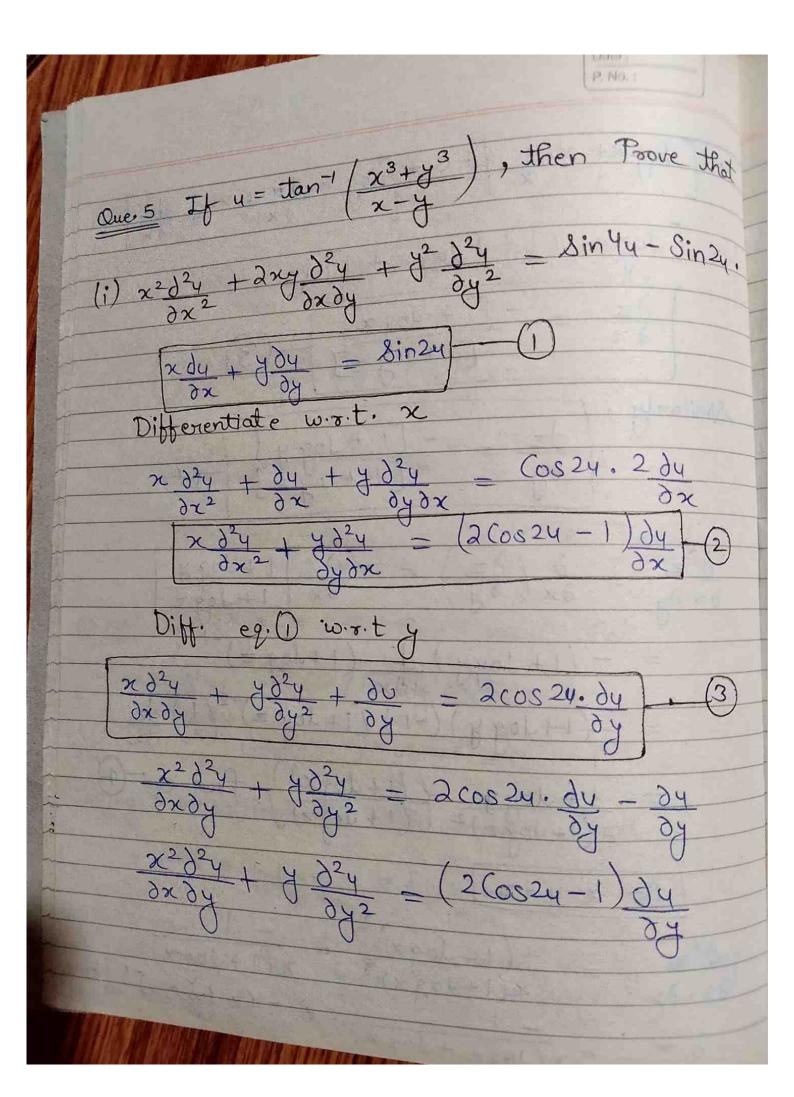
(ii) $\frac{\partial u}{\partial x} + \frac{\partial u}{\partial y} + \frac{\partial u}{\partial z} = \frac{3}{x+y+z}$

(i) $\frac{\partial u}{\partial x} = \frac{1}{x^3 + y^3 + z^3 - 3xyz} = \frac{3x^2 - 3y^2}{(x+y+z)^2}$
 $\frac{\partial u}{\partial y} = \frac{1}{x^3 + y^3 + z^3 - 3xyz} = \frac{3y^2 - 3z^2}{3y^2 - 3z^2}$
 $\frac{\partial u}{\partial x} = \frac{1}{x^3 + y^3 + z^3 - 3xyz} = \frac{3x^2 + 3y^2 + 3z^2 - 3xy}{3x^2 - 3yz - 3zx}$
 $\frac{\partial u}{\partial x} + \frac{\partial u}{\partial y} + \frac{\partial u}{\partial z} = \frac{1}{x^3 + y^3 + z^3 - 3xyz} = \frac{3x^2 + 3y^2 + 3z^2 - 3xy}{-3yz - 3zx}$
 $\frac{x^3 + y^3 + z^3 - 3xyz}{2} = \frac{x^2 + y^2 + z^2 - xy - yz - zx}{2}$
 $\frac{\partial u}{\partial x} + \frac{\partial u}{\partial z} + \frac{\partial u}{\partial z} = \frac{3}{(x+y+z)} = \frac{x^2 + y^2 + z^2 - xy - yz - zx}{2}$
 $\frac{\partial u}{\partial x} + \frac{\partial u}{\partial z} + \frac{\partial u}{\partial z} = \frac{3}{(x+y+z)} = \frac{x^2 + y^2 + z^2 - xy - yz - zx}{2}$
 $\frac{\partial u}{\partial x} + \frac{\partial u}{\partial z} + \frac{\partial u}{\partial z} = \frac{3}{(x+y+z)} = \frac{3}{x^2 + y^2 + z^2 - xy - yz - zx}{2}$

Hence Fromes.







Multiply eq. (2) by x & eq. (3) by y & Add $\frac{\chi^2 \partial^2 y}{\partial \chi^2} + \frac{\chi y}{\partial y} \frac{\partial^2 y}{\partial \chi} + \frac{\chi y}{\partial \chi} \frac{\partial^2 y}{\partial \chi} + \frac{\chi^2 \partial^2 y}{\partial \chi^2} = (2(\cos 2u - 1))$ (xdy +ddy $\frac{\chi^2 \partial^2 y}{\partial \chi^2} + \frac{2\chi y}{\partial \chi} \frac{\partial^2 y}{\partial y} + \frac{\chi^2 \partial^2 y}{\partial y^2} = \left(2\cos 2y - 1\right) \sin 2y$ = 2 Cos24. Sin 24 - Sin 24 = 8in 44 - 8in 24 = 2 Cas 34 Sin4 Que 6 If $y = x^{1/4} + y^{1/4}$, Verify the Euler's theorem? Here, $u = x^{1/4} + y^{1/4}$ $x^{1/5} + y^{1/5}$ Thus, u is a homogenous. n=1/20 funct of x x y of degree 1/20. Hence to verify Euler's theoram for 4 e have to prove that $x \frac{\partial y}{\partial y} + y \frac{\partial y}{\partial y} = \frac{1}{20}y$

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