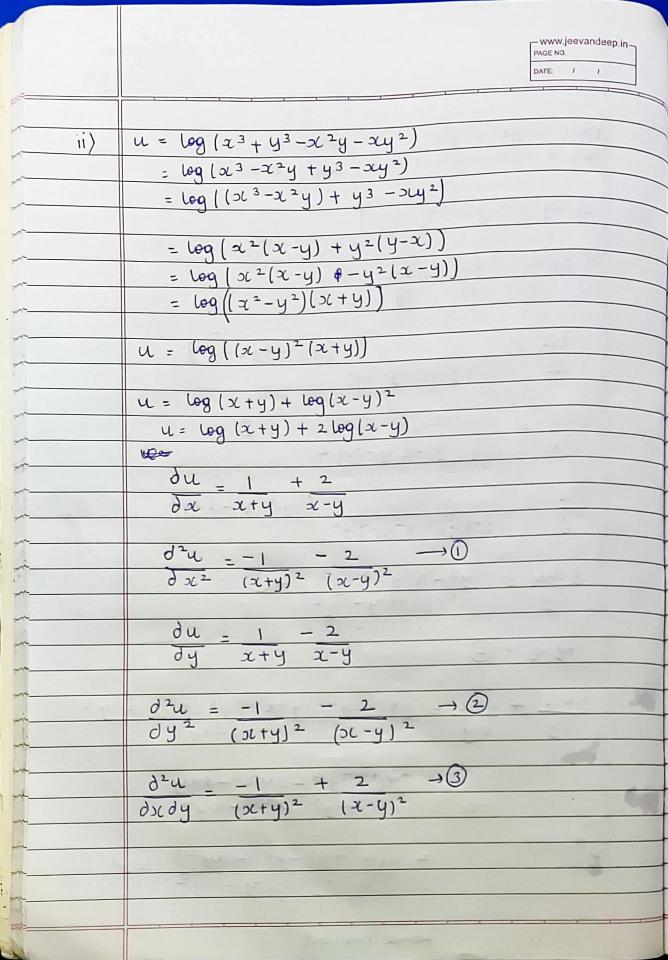
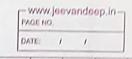
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	DATE: / /
	Name: Pargat singh Batch: A2
	Roll no: 16010121045 Date: 18/1/2022
	the second of th
Q1 >	u= log (x3+y3-x2y-xy2)
	Che and the second of the seco
i>	To prove: xdu +ydu = 3
	dx dy
	:. du = 1 (3x2-2yx-y2)
	$dx \qquad x^3 + y^3 - x^2y - xy^2$
	the sign of enough with a second
	$x du = 3x^3 - 2yx^2 - y^2x - + 0$
	$dx \qquad x^3 + y^3 - x^2y - xy^2$
	- + 1 20
	du = 1 (3y2-x2-2xy)
	dy x3+y3-x2y-2y2
	$y du = 3y^3 - x^2y - 2xy^2 \rightarrow 2$
	dy 23+y3-22y-2y2
	eq 1) + 2
(00)	$xdu + ydu = 3x^3 - 2yx^2 - y^2x + 3y^3 - x^2y - 2xy^2$
	dy dy - x3+ y3-x2y-xy2
	232222
400	$= 3x^3 + 3y^3 - 3yx^2 - 3xy^2$
	$-x^3+y^3-x^2y-xy^2$
	$-2(x^3+u^3-ux^2-xu^2)$
	$= 3(x^{3}+y^{3}-yx^{2}-xy^{2}) = 3$
	$x^{3}+y^{3}-x^{2}y-xy^{2}$
	Hence Proped.
	HIND THOUSEN.





$$\frac{d^2u}{dx^2} + \frac{d^2u}{dy^2} + \frac{2d^2u}{dxdy}$$

$$= \frac{-1}{(x+y)^2} \frac{-2}{(x-y)^2} + \left(\frac{-1}{(x+y)^2} - \frac{2}{(x-y)^2}\right)$$

$$+2\left(-1+2\right)$$
 $(x+y)^{2}$ 
 $(x-y)^{2}$ 

$$\frac{\partial}{(x+y)^2} = -\frac{1}{(x-y)^2} - \frac{1}{(x+y)^2} - \frac{2}{(x-y)^2} - \frac{2}{(x+y)^2}$$

$$(x-y)^{2}$$

$$\frac{1}{2} \int_{-\infty}^{\infty} d^{2}u + 2 d^{2}u + d^{2}u = -4$$

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(Q2) 
$$u = 1$$
,  $y = \sqrt{x^2 + y^2 + z^2}$ 

To prove: 
$$\frac{\partial^2 u}{\partial x^2} + \frac{\partial^2 u}{\partial y^2} + \frac{\partial^2 u}{\partial z^2} = 0$$

$$\frac{\partial x}{\partial x} = \frac{x}{x}, \frac{\partial y}{\partial y} = \frac{y}{x}, \frac{\partial x}{\partial z} = \frac{z}{x}$$

Hence 
$$\frac{\partial^2 u}{\partial x^2} = \frac{-1}{8^3} + \frac{3x}{8^4} \cdot \frac{\partial x}{\partial x} = \frac{-1}{8^3} + \frac{3x^2}{8^5} \rightarrow 0$$

Similarly, 
$$d^2u = -1 + 3y^2 \rightarrow 2$$

$$\frac{dy^2 + 3^3 + 5}{4}$$

$$4 \qquad d^2u = -1 + 3z^2 \rightarrow 3$$

$$\frac{4}{\sqrt[3]{2^2}} \frac{\partial^2 u}{\partial z^2} = -1 + 3z^2 \rightarrow 3$$

Adding 
$$0$$
,  $2$   $43$ 

$$\frac{1}{2}u + \frac{\partial^{2}u}{\partial x^{2}} + \frac{\partial^{2}u}{\partial x^{2}} + \frac{\partial^{2}u}{\partial x^{2}} = \frac{-3}{8^{3}} + \frac{3(x^{3} + y^{2} + z^{2})}{8^{3}}$$

$$= \frac{-3 + 3r^2}{r^3} \left( \text{GErom} \right)$$

$$\frac{\partial^2 u + \partial^2 u + \partial^2 u}{\partial x^2} = 0$$

Herce Proved

To Prone : du = 4 e2t Q3) u= 22+y2+ 22 where x= et, y= etsint, z= etcost (given) de du x de + du x dy + du x dz  $\frac{\partial u}{\partial x} = \frac{2x}{\partial y}, \quad \frac{\partial u}{\partial y} = \frac{2y}{\partial z}, \quad \frac{\partial u}{\partial z} = \frac{2z}{\partial z}$ dx = et, dy = et (sint+cost), dz = et(-sint+cost) du = 2xet+2y(et(sint+cost))+2zet(-sint+cost) = 222 + 242 + 222 + 242 - 242 (Even Guier) = 2 (x2+y2+z2)  $\frac{du}{dt} = 2(x^2 + y^2 + z^2) = 2(e^{2t}(1 + \sin^2 t + \cos^2 t))$ du = 2×2×e2 = 4e2t :. du = 4e2t Hence bround