Subject _____ موضوع الدرس

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Example مثال

$$\frac{p}{z} + \frac{q}{z} = x + y$$

Sol let $Z = \ln z$

$$p = \frac{\partial z}{\partial x} = \frac{\partial z}{\partial Z}\frac{\partial Z}{\partial x} = z\frac{\partial Z}{\partial x}$$

$$\frac{p}{z} = \frac{\partial Z}{\partial x} = p_1$$

$$\frac{q}{z} = \frac{\partial Z}{\partial y} = q_1$$

$$p_1 + q_1 = x + y$$ Case (3)

$$p_1 - x = -q_1 + y = a$$

$$p_1 - x = a \Rightarrow p_1 = a + x \quad , F_1$$

$$-q_1 + y = a \Rightarrow q_1 = y - a \quad , F_2$$

$$Z = \int (a+x)\,dx + \int (y-a)\,dy$$

$$Z = ax + \frac{x^2}{2} + \frac{y^2}{2} - ay + C$$

$$\ln z = ax + \frac{x^2}{2} + \frac{y^2}{2} - ay + C$$

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Final Complete Solution

Q1 نهائي 2021 2022

$$p^2 z^4 = 2 - z^2 q^2$$

سؤال عن الحالات الـ ٦

$F(p, q, z)$ Case ③

$u = x + ay$, $p = \frac{\partial z}{\partial u}$, $q = \frac{\partial z}{\partial u} a$

$$\left(\frac{\partial z}{\partial u}\right)^2 z^4 = 2 - z^2 \left(a \frac{\partial z}{\partial u}\right)^2$$

$$\left(\frac{\partial z}{\partial u}\right)^2 z^4 + z^2 \left(a \frac{\partial z}{\partial u}\right)^2 = 2$$

$$\left(\frac{\partial z}{\partial u}\right)^2 \left[z^4 + z^2 a^2\right] = 2$$

$$\left(\frac{\partial z}{\partial u}\right)^2 z^2 \left(z^2 + a^2\right) = 2$$

نجذر الطرفين

$$\frac{\partial z}{\partial u} z \sqrt{z^2 + a^2} = \mp \sqrt{2}$$

$$\partial z \; z \sqrt{z^2 + a^2} = \mp \sqrt{2} \; \partial u$$

$$\int z \sqrt{z^2 + a^2} \; \partial z = \mp \int \sqrt{2} \; \partial u$$

مشتقة

$$\frac{1}{2} \cdot \frac{2}{3} \left(z^2 + a^2\right)^{\frac{3}{2}} = \mp \sqrt{2} \; u + C$$

$$\frac{1}{3} \left(z^2 + a^2\right)^{\frac{3}{2}} = \mp \sqrt{2} \; u + C$$

$u \to (x + ay)$ نعوض قيمتها