Subject _____ موضوع الدرس

Date: / / الموافق / / التاريخ

ex (3) $p^2 + q^2 = z^2(x+y)$ ملزفة

Sol

$$\left(\frac{p}{z}\right)^2 + \left(\frac{q}{z}\right)^2 = (x+y)$$

let $Z = \ln z$

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

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

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

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

$$\left(\frac{\partial Z}{\partial x}\right)^2 + \left(\frac{\partial Z}{\partial y}\right)^2 = (x+y)$$

Case (3)

$$\left(\frac{\partial Z}{\partial x}\right)^2 - x = y - \left(\frac{\partial Z}{\partial y}\right)^2 = a$$

$$\left(\frac{\partial Z}{\partial x}\right)^2 - x = a \Rightarrow \frac{\partial Z}{\partial x} = \sqrt{a+x}$$

$$\Rightarrow \frac{\partial Z}{\partial y} = \sqrt{y-a}$$

$$\int dZ = \int \sqrt{a+x}\,dx + \int \sqrt{y-a}\,dy$$

$$Z = \frac{2}{3}(a+x)^{\frac{3}{2}} + \frac{2}{3}(y-a)^{\frac{3}{2}} + C$$

الحل z

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ex واجب $q^2y^2 = z(z - px)$

ex ④ $x^2p^2 - yqz - z^2 = 0$

طريقة

Sol

الفرضيات

$X = \ln x \;,\; Y = \ln y \;,\; Z = \ln z$

$xp = \frac{\partial z}{\partial x} = p_1 \;,\; yq = \frac{\partial z}{\partial y} = q_1 \frac{q}{z}$

بالتعويض في المعادلة

$\Rightarrow [p_1^2 - q_1 z = z^2] \div z^2$

$\Rightarrow \left[\left(\frac{p_1}{z}\right)^2 - \frac{q_1}{z} = 1\right]$

$p_1 = \frac{\partial z}{\partial x} = \frac{\partial z}{\partial Z}\cdot\frac{\partial Z}{\partial x} = z\cdot\frac{\partial Z}{\partial x} = \frac{p_1}{z} = \frac{\partial Z}{\partial x} = p_2$

$q_1 = \frac{\partial z}{\partial y} = \frac{\partial z}{\partial Z}\cdot\frac{\partial Z}{\partial y} = z\cdot\frac{\partial Z}{\partial Y} = \frac{q_1}{z} = \frac{\partial Z}{\partial y} = q_2$

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

Case 1

$p_2^2 - q_2 = 1$

نفرض $p_2 = a$

$q_2 = b$