Assignment 3

Mathematics - III

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1) Using exponential parameterization to a function i given by

$$\text{Then } 1(t)^{\frac{1}{t}} = \lim_{n\to\infty}\left(1+\frac{1}{n}\right)^{n} = e$$

Proof: as by binomial theorem

$$= 1(t)^{\frac{1}{t}} = \sum_{k=0}^{\infty} \binom{\frac{1}{t}}{k} 1^{\frac{1}{t}-k} \left(\frac{1}{t}\right)^{k}$$

$$= 1(t)^{\frac{1}{t}} = \sum_{k=0}^{\infty} \binom{\frac{1}{t}}{k} 1^{\frac{1}{t}-k} \left(\frac{1}{t}\right)^{k} \left(\frac{1}{t}\right)^{k} \left(\frac{1}{t}\right)^{k}$$

$$= 1(t)^{\frac{1}{t}} = \sum_{k=0}^{\infty} \binom{\frac{1}{t}}{k} 1^{\frac{1}{t}-k} \left(\frac{1}{t}\right)^{k} \left(\frac{1}{t}\right)^{k} \left(\frac{1}{t}\right)^{k} \cdots \text{ where } \frac{1}{t} \text{ tend}$$

Taking derivative

$$1'(t) = \sum_{k=0}^{\infty} \binom{\frac{1}{t}}{k} 1^{\frac{1}{t}-k} \left(\frac{1}{t}\right)^{k} \cdots \text{ of } 1_t = 0$$

$$\text{lim} = x^{\frac{1}{t}} = \left(\frac{1}{t}\right)(\text{lim})$$

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So we have having can we

$$\text{then } 1(t)^{\frac{1}{t}} = x^{\frac{1}{t}} \left(\frac{1}{t}\right)(\text{lim})$$

$$\boxed{1'(t) = 1(t)^{\frac{1}{t}} \left(\frac{1}{t}\right)}$$

2) $x^{2}+y^{2}+z^{2}=1$

Having point $x^{2}+y^{2}=1$

$$\text{then } \frac{\partial(x^{2}+y^{2}+z^{2})}{\partial x} = 1$$

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

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

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

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

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$$\text{Ans } \