7.63

$$u = \frac{1}{\sqrt{x^2+y^2+z^2}}, \quad u = (x^2+y^2+z^2)^{-1/2}$$

$$u'_x = -\frac{x}{\sqrt{(x^2+y^2+z^2)^3}} \qquad u''_{xy} = \left(-\frac{x}{\sqrt{(x^2+y^2+z^2)^3}}\right)'_y = \frac{3xy}{(x^2+y^2+z^2)^{5/2}}$$

$$u'_y = -\frac{y}{\sqrt{(x^2+y^2+z^2)^3}} \qquad u''_{xx} = \frac{2x^2-y^2-z^2}{(x^2+y^2+z^2)^{5/2}}$$

$$u'_z = -\frac{z}{\sqrt{(x^2+y^2+z^2)^3}}$$

1198 $r = \rho^2 \sin^4\Theta$. $\frac{\partial r}{\partial \rho}$ - ? $\frac{\partial r}{\partial \Theta}$ - ?

$$\frac{\partial r}{\partial \rho} = 2\rho \sin^4\Theta, \qquad \frac{\partial r}{\partial \Theta} = 4\rho^2 \sin^3\Theta \cos\Theta.$$

1200 $z = e^{xy(x^2+y^2)}$

$$\frac{\partial z}{\partial x} = e^{xy(x^2+y^2)} \cdot \left(y(x^2+y^2) + xy\,2x\right) = \left(3x^2y + y^3\right) e^{xy(x^2+y^2)}$$

$$\frac{\partial z}{\partial y} = e^{xy(x^2+y^2)} \left(x(x^2+y^2) + xy \cdot 2y\right) = \left(3xy^2 + x^3\right) e^{xy(x^2+y^2)}$$

1202 $u = e^{\frac{x}{y}} + e^{-\frac{z}{y}}$

$$u'_x = e^{\frac{x}{y}} \cdot \frac{1}{y} = \frac{e^{x/y}}{y}; \qquad u'_y = -\frac{xe^{x/y}}{y^2} + \frac{ze^{-\frac{z}{y}}}{y^2}$$

$$u'_z = -\frac{1}{y} e^{-z/y}$$