$$\frac{\partial}{\partial x_\mu}\frac{\partial}{x^\mu}\phi(\hat{x}) = g^{\sigma\nu}\frac{\partial}{\partial x^\sigma}\frac{\partial}{\partial x^\nu}\phi(\hat{x}) = (*)$$

$$\boxed{\frac{\partial}{\partial x^\nu}\phi(\hat{x}) = \frac{\partial}{\partial x^\nu}\phi\left(x^\xi \frac{\partial \hat{x}^\eta}{\partial x^\xi}\right) = \partial_\eta \phi(\hat{x})\frac{\partial \hat{x}^\eta}{\partial x^\nu}}$$

$$(*) = g^{\sigma\nu}(\partial_{\eta_1}\partial_{\eta_2}\phi)(\hat{x})\frac{\partial \hat{x}^{\eta_1}}{\partial x^\nu}\frac{\partial \hat{x}^{\eta_2}}{\partial x^\sigma} = g^{\sigma\nu}\Lambda^{\hat{\eta}_1}_{\nu}\Lambda^{\hat{\eta}_2}_{\sigma}(\partial_{\eta_1}\partial_{\eta_2}\phi)(\hat{x}) =$$

$$= \hat{g}^{\eta_1\eta_2}(\partial_{\eta_1}\partial_{\eta_2}\phi)(\hat{x}) = (\partial^\mu\partial_\mu\phi)(\hat{x})$$