

$$\begin{aligned} dx = \Delta x = -0.03, \quad dy = \Delta y = -0.05, \quad z = x^2 - xy + 9y^2, \quad z_x = 2x - y, \\ z_y = 18y - x. \quad \text{Thus when } x = 1 \text{ and } y = -1, \\ dz = (3)(-0.03) + (-19)(-0.05) = 0.86 \text{ while} \\ \Delta z = (0.97)^2 - (0.97)(-1.05) + 9(-1.05)^2 - (1 + 1 + 9) \approx 0.8819. \end{aligned}$$