

$$\textcircled{3} \text{(a)} DF_{(x,y)} = \begin{pmatrix} \frac{1}{4} & \frac{\pi \cos(2\pi y)}{2} \\ 0 & 2 \end{pmatrix} \quad \text{at last point.}$$

$$DF_{(x,y)} \begin{pmatrix} 1 \\ 0 \end{pmatrix} = \frac{1}{4} \begin{pmatrix} 1 \\ 0 \end{pmatrix}$$

$$DF_{(x,y)}^n \begin{pmatrix} 1 \\ 0 \end{pmatrix} = \left(\frac{1}{4}\right)^n \begin{pmatrix} 1 \\ 0 \end{pmatrix}.$$

$$h(p_0, \underline{v}; F) = \lim_{n \rightarrow \infty} \frac{\ln |DF_{(x,y)}^n \begin{pmatrix} 1 \\ 0 \end{pmatrix}|}{n} = \lim_{n \rightarrow \infty} \frac{n \ln \frac{1}{4}}{n} = \ln\left(\frac{1}{4}\right).$$

$$\text{(b)} \Delta = \det DF_{(x,y)} = \frac{1}{4} \cdot 2 = \frac{1}{2}.$$

$$\ln\left(\frac{1}{2}\right) = \ln\left(\frac{1}{4}\right) + h_1(p)$$

$$\therefore h_1(p) = \ln\left(\frac{1}{2}\right) - \ln\left(\frac{1}{4}\right) = \ln\left(\frac{4}{2}\right) = \ln 2.$$

$$\text{(c)} \dim_{\mathbb{L}} = 1 + \frac{\ln 2}{|\ln(\frac{1}{4})|} = 1 + \frac{\ln 2}{2 \ln 2} = 1 + \frac{1}{2} = 1.5$$