

$$8. f(x, y) = e^x y^3 \quad (0, 2)$$

$$f_x(x, y) = e^x y^3$$

$$f_x(0, 2) = e^0 (2)^3 \\ = \textcircled{8}$$

$$f_y(x, y) = 3e^x y^2$$

$$f_y(0, 2) = 3e^0 (2)^2 \\ = \textcircled{12}$$

$$9. f(x, y) = \frac{3x-y}{2x+5y} \quad (1, 2)$$

$$f(x, y) = \frac{3x-y}{2x+5y} \quad \begin{matrix} P & P' = 3 \\ Q & Q' = 2 \end{matrix}$$

$$\frac{P'Q - PQ'}{Q^2}$$

$$f_x(x, y) = \frac{3(2x+5y) - (3x-y)(2)}{(2x+5y)^2}$$

$$= \frac{6x+15y-6x+2y}{(2x+5y)^2}$$

$$= \frac{17y}{(2x+5y)^2}$$

$$f_x(1, 2) = \frac{17(2)}{(2 \cdot 1 + 5 \cdot 2)^2}$$

$$= \frac{34}{12^2}$$

$$= \frac{34}{144}$$

$$= \textcircled{\frac{17}{72}}$$

$$f(x, y) = \frac{3x-y}{2x+5y} \quad \begin{matrix} P & P' = -1 \\ Q & Q' = 5 \end{matrix}$$

$$\frac{P'Q - PQ'}{Q^2}$$

$$f_y = \frac{-1(2x+5y) - (3x-y)5}{(2x+5y)^2}$$

$$= \frac{-2x-5y-15x+5y}{(2x+5y)^2}$$

$$= \frac{-17x}{(2x+5y)^2}$$

$$f_y(1, 2) = \frac{-17(1)}{(2 \cdot 1 + 5 \cdot 2)^2}$$

$$= \frac{-17}{12^2}$$

$$= \textcircled{\frac{-17}{144}}$$