

$$14. \vec{F}(x, y, z) = \underbrace{x^2 y z^3}_{M} \vec{i} + \underbrace{(x^2 - y^2)}_{N} \vec{j} + \underbrace{z^4}_{P} \vec{k} \quad (3, 1, 1)$$

$$\operatorname{div} \vec{F}(x, y, z) = \frac{\partial M}{\partial x} + \frac{\partial N}{\partial y} + \frac{\partial P}{\partial z}$$

$$= \partial x y z^3 + (-\partial y) + 4z^3$$

$$\begin{aligned} \operatorname{div} \vec{F} \begin{matrix} (3, 1, 1) \\ x \quad y \quad z \end{matrix} &= \partial(3 \times 1 \times 1)^3 - \partial(1) + 4(1)^3 \\ &= 6 - 2 + 4 \\ &= \textcircled{8} \end{aligned}$$