

Answer on 39181, Math, Other From

$$\delta f = 2xyz^3\vec{i} + x^2z^3\vec{j} + 3x^2yz^2\vec{k}$$

we see that

$$\frac{\partial f}{\partial x} = 2xyz^3, \quad \frac{\partial f}{\partial y} = x^2z^3, \quad \frac{\partial f}{\partial z} = 3x^2yz^2$$

from where we can easily find (by integrating with respect to x first one equation)

$$f = x^2yz^3 + C$$

where C in integration constant which can be found from condition

$$f(1, -2, 2) = 4$$

we have

$$1^2 \cdot (-2) \cdot 2^3 + C = 4$$

$$C = 4 + 16 = 20$$

Hence

$$f = x^2yz^3 + 20$$