Answer on Question #79477 – Math – Calculus

Question

Let

$$A = x^2yzi - 2xz^3j - xz^2k$$

and

$$B = 4zi + yj + 4x^2k$$

find

$$\frac{\partial^2}{\partial x \partial y}(A \times B)\ at\ (1,0,-2)$$

Solution

$$A \times B = \begin{vmatrix} i & j & k \\ x^2yz & -2xz^3 & -xz^2 \\ 4z & y & 4x^2 \end{vmatrix} = i(-8x^3z^3 + xyz^2) - \mathrm{j}(4\mathrm{x}^4\mathrm{yz} + 4\mathrm{xz}^3) + \mathrm{k}(\mathrm{x}^2\mathrm{y}^2\mathrm{z} + 8\mathrm{xz}^4)$$

$$\frac{\partial}{\partial y}(\mathrm{A} \times \mathrm{B}) = \mathrm{i}(\mathrm{xz}^2) - \mathrm{j}(4\mathrm{x}^4\mathrm{z}) + \mathrm{k}(2\mathrm{x}^2\mathrm{yz})$$

$$\frac{\partial^2}{\partial x \partial y}(A \times B) = \mathrm{z}^2\mathrm{i} - 16\mathrm{x}^3\mathrm{zj} + 4\mathrm{xyzk}$$

$\frac{\partial^2}{\partial x \partial y}(A \times B)\ at\ (1,0,-2)$ is $4i + 32j$.

Answer: $4i + 32j$