

High score: 20; (nonzero) Low score: 15; Average score: 19.76

Problem 1 (20 Points). Find the gradient vector field of $f(x, y, z) = xy^2z$.

Solution.

$$\vec{F}(x, y, z) = \nabla f(x, y, z) = \left\langle \frac{\partial}{\partial x} [xy^2z], \frac{\partial}{\partial y} [xy^2z], \frac{\partial}{\partial z} [xy^2z] \right\rangle = \boxed{\langle y^2z, 2xyz, xy^2 \rangle}$$