

1. Find the directional derivative of the function $f(x,y,z) = x * y^2 * z^3$ at the point $(2,1,1)$ in the direction $\langle 2,-1,-1 \rangle$

Unit Vector = $\langle 2,-1,-1 \rangle / \sqrt{6}$

D_u of $(x,y,z) = (y^2 * z^3) (2/\sqrt{6}) + (2xy * z^3) (-1/\sqrt{6}) + (3x * y^2 * z^2) (-1/\sqrt{6})$

D_u of $(2,1,1) = (2/\sqrt{6}) - (4/\sqrt{6}) - (6/\sqrt{6})$

D_u of $(2,1,1) = -3.27$