"QUIZ" for Lecture 8

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E-MAIL SCANNED .pdf OF COMPLETED QUIZ to DrZcalc3@gmail.com (Attachment: qXFirstLast.pdf) ASAP BUT NO LATER THAN Oct. 1, 2020, 8:00pm

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

$\nabla f(x,y,z) = (y^2z^3, 2xyz^3, 3xy^2z^2)$ $u = \left(\frac{\sqrt{6}}{3}, \frac{-\sqrt{6}}{6}, \frac{-\sqrt{6}}{6}\right)$

$\nabla f(2,1,1) = (1,4,6)$ *the directional derivative is* $\nabla f * u = -\frac{4\sqrt{6}}{3}$

2. Find the maximum rate of change of $f(x, y) = x^2 + y^3$ at the point $(2, 1)$ and the direction in which is occurs.

$\nabla f(x,y) = (2x, 3y^2)$ $\nabla f(2,1) = (4,3)$

the maximum rate of change is $(4,3) * \left(\frac{4}{5}, \frac{3}{5}\right) = 5$ *the direction is* $(\frac{4}{5}, \frac{3}{5})$