

"QUIZ" for Lecture 8

NAME: (print!) Aayushi Kasera Section: _____

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 $\langle 2, -1, -1 \rangle$.

$$v = \langle 2, -1, -1 \rangle$$

$$u = \left\langle \frac{2}{\sqrt{6}}, -\frac{1}{\sqrt{6}}, -\frac{1}{\sqrt{6}} \right\rangle$$

$$f_x = y^2z^3 \Rightarrow 1$$

$$f_y = 2xy^2z^3 \Rightarrow 4$$

$$f_z = 3xy^2z^2 \Rightarrow 6$$

$$= \langle 1, 4, 6 \rangle$$

$$\langle 1, 4, 6 \rangle \cdot \left\langle \frac{2}{\sqrt{6}}, -\frac{1}{\sqrt{6}}, -\frac{1}{\sqrt{6}} \right\rangle$$

$$\frac{2}{\sqrt{6}} - \frac{4}{\sqrt{6}} - \frac{6}{\sqrt{6}} = \underline{\underline{-\frac{8}{\sqrt{6}}}}$$

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 it occurs.

$$f_x = 2x \rightarrow 4$$

$$f_y = 3y^2 \rightarrow 3$$

$$\langle 4, 3 \rangle$$

$$\sqrt{16 + 9} \\ = \underline{\underline{25}}$$