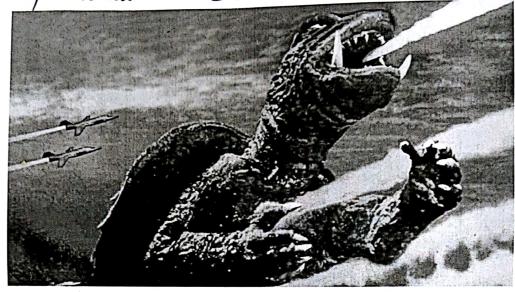
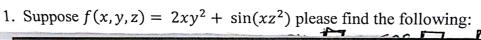
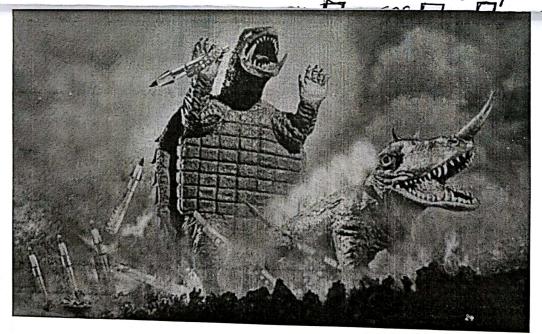
IDSC 6490 Reasonably Famous Monsters Homework

Week 9 The Multivariate Calculus

Name Danny Monada 5445381







$$\begin{array}{ll}
0 & f(x, y, z) = 2xy^2 + \sin(xz^2) & \sin(xz^2) \\
0 & f_{x^2} = 2y^2 + \sin(xz^2) & (f_{*}g) \\
f_{x} = 2y^2 + \cos(xz^2) & z^2
\end{array}$$

$$\begin{array}{ll}
f_{x} = 2y^2 + z^2\cos(xz^2) \\
f_{x} = 2y^2 + z^2\cos(xz^2)
\end{array}$$

$$\begin{array}{ll}
f_{y} = 4xy \\
f_{y} = 4y
\end{array}$$

$$\begin{array}{ll}
f_{y} = 4y
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$$\begin{array}{ll}
f_{y} = 2xy
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$$\begin{array}{ll}
f_{y} = 5xy
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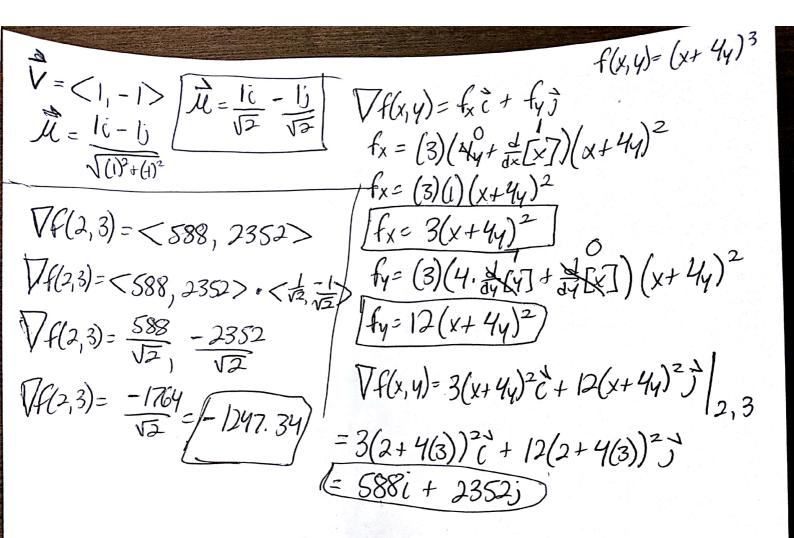
$$\begin{array}{ll}
f_{y$$

$$SIN' \square = COS \square + \square'$$
 $COS' \square = -SIN \square + \square'$
 $(f \cdot g)' = fg' + gf'$

 $f(x,y) = xy - 2x^2 - y^2 + 110x + 74y.$ f(x,y)= xy-2x2-y2+110x+74y 4=4(42)-110 y = 4x - 110fx= 4-4x+110 4=268-110 x-2(4x-110)=-74 14= 581 X-8x +220= -74 $-\frac{7x}{7} = -\frac{294}{7} \left[x = 42 \right]$ The critical point is (42,58) Da,b)<0 saddle fx= y- 4x + 110 fy= x-2y+ 74 (fxy= fxx=-4) /fyy=-2) D(a,b) = 0 inclusive $\mathcal{D}(x,y) = (f_{xx})(f_{yy}) - (f_{xy})^2$ txx < 0 = maximum $D(x,4)=(-4)(-2)-(1)^2$ $t_{xx} > 0 = minim$ evaluate tx. TO(x,4)= 7 | This is greater than 0, so we .f(42,58)=(42)(58)-2(42²)-58° fix=-40; -420, therefore maximum. + 110(42)+ 74/58 The critical point (42,58) is a maximum. The critical point (42,58) is a maximum. f(42,58)=4456 | The maximum point is 4456 3. Please find the derivative of $f(x,y) = (x+4y)^3$ in the direction of $\vec{v} = <1, -1>$ at the point

3. Please find the derivative of $f(x,y) = (x+4y)^3$ in the direction of $v-\sqrt{1}$, at the point (2,3). That is please find $\nabla f(x,y) \cdot \vec{u}$ at the point (2,3) where \vec{u} is the vector in the direction of \vec{v} .

faind another typo u,



4. Please evaluate the following multiple integrals ©.

I know I only did a "two-er" on the vid but I'm making sure that you can extrapolate.

$$\left(\int_{-1}^{1} \left(\int_{0}^{1} \left(\int_{0}^{1} xyz \, dx\right) dy\right) dz\right)^{2}$$

$$\int_{0}^{1} xyz dx = \frac{1}{2}x^{2}yz \Big|_{0}^{1} \frac{1}{2}(1)(yz) - \frac{1}{2}(0^{2})(yz)$$

$$= \frac{1}{2}(1)(yz) - 0$$

$$= \frac{1}{2}yz$$

$$\frac{3}{2} \int_{-\frac{1}{2}}^{1} \frac{1}{4} (1^{2})(2) - \frac{1}{4} (0^{2})(2) - \frac{$$

$$3 \int_{-1}^{1} \frac{1}{42} = \frac{1}{8}z^{2} \int_{-1}^{1} \frac{1}{8}(1)^{2} - \frac{1}{8}(-1)^{2}$$

$$= \frac{1}{8} - \frac{1}{8}$$

$$= \frac{1}{8} - \frac{1}{8}$$

5. Please integrate the function f(x, y) = x + 2y where $0 \le x \le 1$ and $1 \le y \le \sqrt{x}$. You will definitely want to draw a picture here 0.

$$f(x,y) = \chi + 2y$$

$$\int_{0}^{1} \sqrt{1}x$$

$$\int_{0}^{1} \chi + 2y \, dy \, dx$$

$$\int_{0}^{33} x^{34} + \frac{x}{4} - x + \frac{1}{4} dx = \frac{1}{40} x (16x^{3/2} - 15x + 10) \Big|_{0}^{1}$$

$$= \frac{1}{40} (16(1)^{3/2} - 15(1) + 10) - 0$$

$$= \frac{1}{40} (16 - 15 + 10)$$

$$= \frac{1}{40} (11) = \sqrt{\frac{11}{40}}$$