A7

Friday, November 25, 2022 2:24 PM

Assessment 7
Dusty Wilson
Math 163

Name: key 2:27

I believe the true measure of a person is whether you have learnt to sacrifice yourself in the service of others.

Musa Manzi
born in 1984 (South African Geoscientist)

No work = no credit
No CAS Calculators

Warm-ups (1 pt each): $\sum_{n=1}^{\infty}\frac{1}{n}=$ ∞ (Harmonic series) $\quad \frac{\partial}{\partial x}x=$ 1 $\quad \frac{\partial}{\partial x}y=$ 0

1.) (1 pt) The quote by Manzi (above) is from the professor in a video we watched earlier this quarter. How does Manzi assess value in himself/others? Answer using complete English sentences.

True value comes thru sacrifice and service.

2.) (8 pts) Consider $f(x,y)=\cos(x)+x^5y^9+5x^4y+\tan^{-1}(y)$

a.) Find $f_y(x,y)$ $= 0 + 9x^5y^8 + 5x^4 + \frac{1}{1+y^2}$

$= 9x^5y^8 + 5x^4 + \frac{1}{1+y^2}$ $\quad (1,0)\to(1,1)$

b.) Find and interpret $f_y(1,0)$ (use a complete English sentence).

z increase by about 6 units.

$f_y(1,0) = 9(1)^5(0) + 5(1)^4 + \frac{1}{1+0}$

$= 5+1 = 6$ The slope in the y-direction @ (1,0) is 6.

c.) Find $\frac{\partial^2 f}{\partial x\,\partial y}$ $= f_{yx}(x,y)$

$= 45x^4y^8 + 20x^3 + 0$

3.) (8 pts) Find the first partials f_x and f_y if $f(x,y) = 5x^3 \ln(x) \sin(y^2)$.

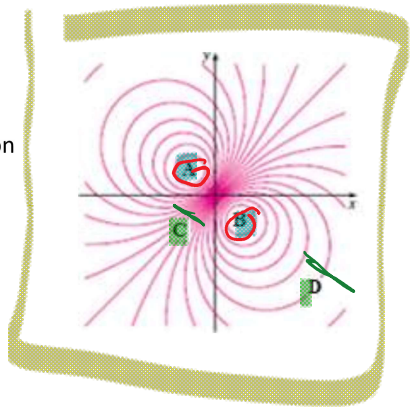
$$f_x(x,y) = \sin(y^2)\left[15x^2 \ln x + 5x^3 \cdot \frac{1}{x}\right]$$

$$= 5x^2 \sin(y^2)\left[3 \ln x + 1\right]$$

$$f_y(x,y) = 10x^3 y \ln(x) \cos(y^2).$$

4.) (8 pts) The follow questions relate to contour plots.

a.) A function $z = f(x,y)$ has the given contour plot.



a. What do the points labeled A and B have in common on the graph of *f*?

local

A and B are extremes ... either max/mins. (possibly different).

b. Based upon the contour plot, how does the graph of *f* differ at points C and D?

The graph is steeper @ C than @ D

b.) Carefully sketch a contour plot of $f(x,y) = 2x + 3y$. Make sure to include at least four labeled contour lines as well as to label your axes.

$0 = 2x + 3y$

x	y
0	0
0	0

$6 = 2x + 3y$

x	y
0	2
3	0

$12 = 2x + 3y$

x	y
0	4
6	0

$18 = 2x + 3y$

x	y
0	6
9	0