Quiz 3

Name: Solutions.

[10] **1.** For the function $f(x, y) = x\sin(xy) + x^2y^3$, find:

a) f_x $\sin xy + xy\cos(xy) + 2xy^3$ (2)

b) f_{xx} $2y\cos(xy) - xy^2\sin(xy) + 2y^3$ (2)

c) f_{xy} $2x\cos(xy) - x^2y\sin(xy) + 6xy^2$ (2)

d) f_y $x^2\cos(xy) + 3x^2y^2$ (2)

e) f_{yx} $= f_{xy}$ Clairaut's theorem (2)

[10] **2.** find the equation of the tangent plane to the surface $z = \dfrac{y}{x^3+1}$ at the point on the surface where $x = 1$ and $y = 2$.

$f(x,y) = \dfrac{y}{x^3+1}$

$f_x = \dfrac{d}{dx}\left(y(x^3+1)^{-1}\right)$

$= \dfrac{-3x^2y}{(x^3+1)^2}$ (2)

@ $(1,2)$ $= -3/2$ (1)

$f_y = \dfrac{1}{x^3+1}$ (2)

@ $(1,2)$

$= 1/2$ (1)

(4)

$z - 1 = -3/2(x-1) + 1/2(y-2)$

or $z = -3/2\,x + 3/2 + 1/2\,y - 1 + 1$

$= -3/2\,x + 1/2\,y + 3/2.$