Partial Derivatives

a) $f(x,y,z) = 1 + xy^2 - 2z^2$

$\partial f/\partial x = y^2 - 2z^2$

$\partial f/\partial y = 2xy - 2z^2$

$\partial f/\partial z = xy^2 - 4z$

b) $f(x,y,z) = yz\ln(xy)$

$\partial f/\partial x = y\cancel{z}/x$

$\partial f/\partial y = z\ln(xy) + z$

$\partial f/\partial z = y\ln(xy)$

c) $f(x,y,z) = e^{-(x^2+y^2+z^2)}$

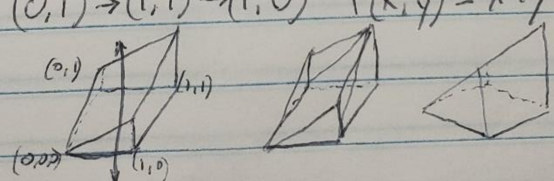
$\partial f/\partial x = -2xe^{-x^2-y^2-z^2}$

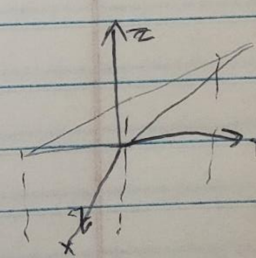
$\partial f/\partial y = -2ye^{-x^2-y^2-z^2}$

$\partial f/\partial z = -2ze^{-x^2-y^2-z^2}$

More Line Integrals

1. $(0,1) \to (1,1) \to (1,0)$ $f(x,y) = x + y$

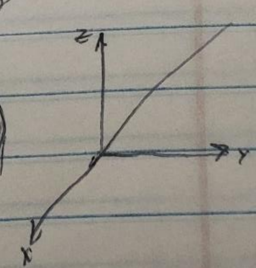




$$\int_0^1\int_0^1\int_0^{z=x+y} dz\,dx\,dy$$

$$\int_0^1\int_0^1 z(x+y)\Big|_0^{z=x+y} dx\,dy = \iint_0^1 x^2+2xy+y^2\,dx\,dy$$

$$= \int_0^1 \left(\frac{x^3}{3} + x^2y + xy^2\right)\Big|_0^1 dy = \int_0^1 \frac{1}{3} + y + y^2\,dy$$



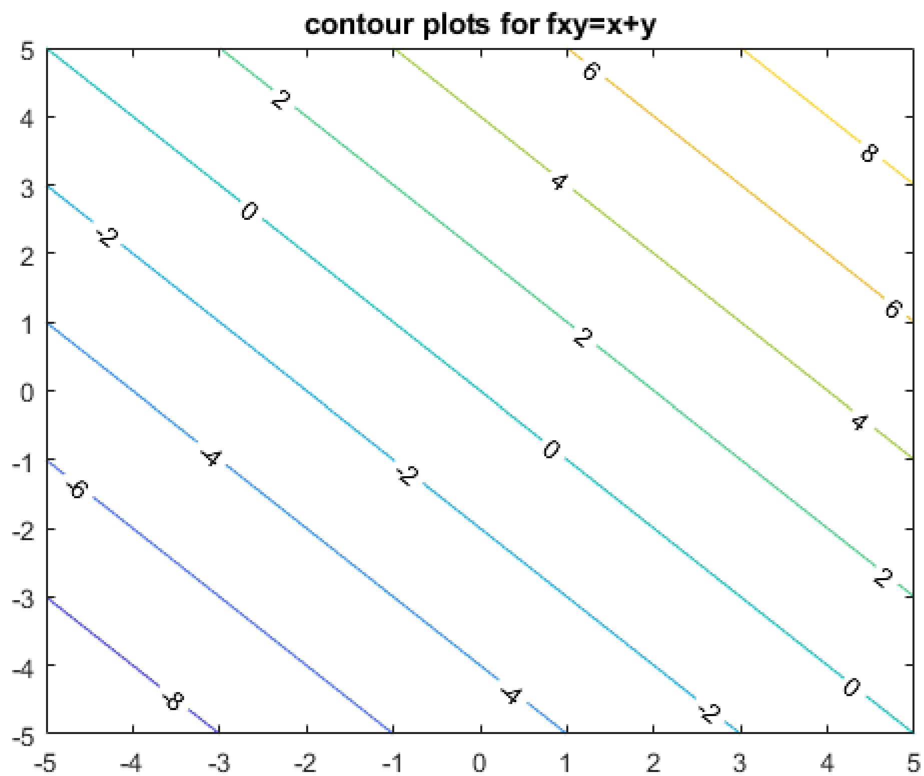
$$= \int_0^1\int_0^1 (x+y)\,dx\,dy = \int_0^1 \left(y + \frac{1}{2}\right)dy = 1$$

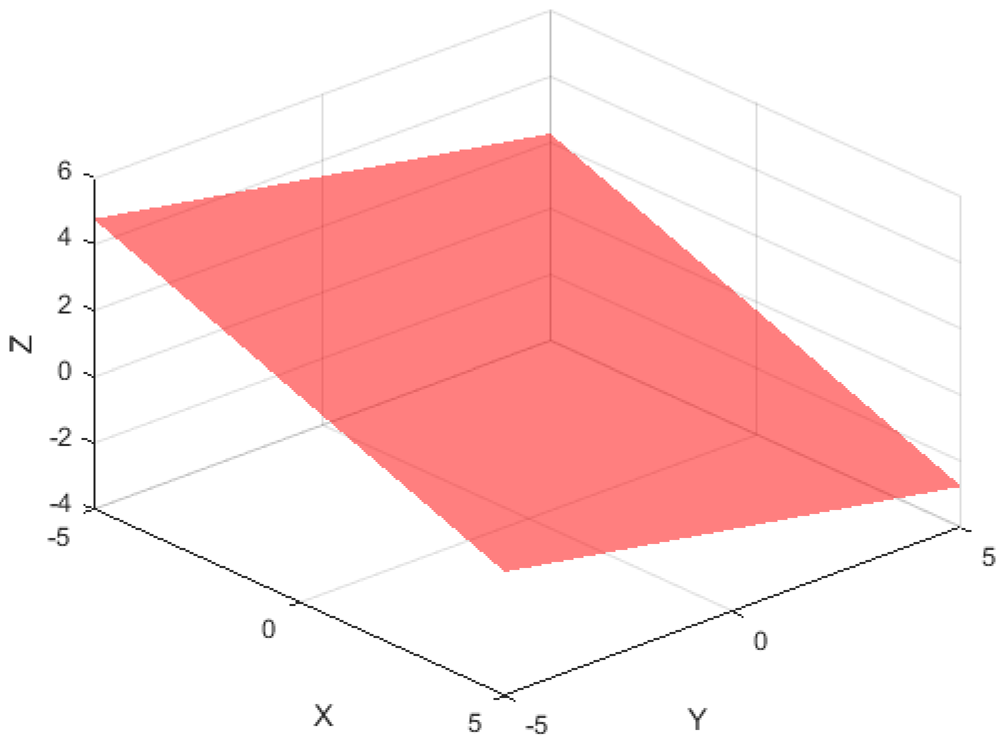
2. $f(x,y) = x$ $y^2 = 1 - x^2 \Rightarrow x^2 + y^2 = 1$ from $(0,1)$ to $(1,0)$

Triple Integral With Cartesian Coordinate System

1. volume bounded by $x=0$, $y=0$, $z=0$ and $2x+y+4z=4$

there is no area bounded




6
4
2
0
-2
-4
Z
-5
0
5
X
-5
0
5
Y