Study Guide 6

Partial derivatives

1. Compute the indicated partial derivatives of the functions given below.

(a) $f(x, y, z) = 2x^3y^2z + 3x^2y^5z^3 - 4xy^3 + yz^4$.

$f_x =$

$f_y =$

$f_z =$

(b) $w = \dfrac{u^2v}{u + v^2}$.

$\dfrac{\partial w}{\partial u} =$

$\dfrac{\partial w}{\partial v} =$

(c) $F(x, y, z, \lambda) = 10\ln(x^2y^5z^3) - \lambda(5x + 2y + 8z)$.

$F_x =$

$F_\lambda =$

(d) $z = 2y^2e^{x^2y}$.

$\dfrac{\partial z}{\partial x} =$

$\dfrac{\partial z}{\partial y} =$

(e) $z = 3x^2 + 4xy - 5y^2 - 4x + 7y - 2$,

$z_x =$

$z_y =$

(f) $F(u, v, w) = 60u^{2/3}v^{1/6}w^{1/2}$

$\dfrac{\partial F}{\partial u} =$

$\dfrac{\partial F}{\partial w} =$

(g) $w = x^2z\ln(y^2 + z^3)$

$w_x =$

$w_y =$

$w_z =$

(h) $q(u, v) = \dfrac{u^2v - 3uv^3}{2u + 3v}$

$\dfrac{\partial q}{\partial u} =$

$\dfrac{\partial q}{\partial v} =$