Answer on Question #52227 – Math –Multivariable Calculus

Suppose
f(x,y)=sin2xcosy+xy2.
what is ∂f/∂y ?

Solution

Let's compute the partial derivative of function $f(x,y)=\sin 2x\cos y+xy^2$ with respect to y, with x held constant:

$$\frac{\partial f}{\partial y}=\frac{\partial}{\partial y}\left(\sin 2x\cos y+xy^2\right)=\sin 2x\frac{\partial}{\partial y}\left(\cos y\right)+x\frac{\partial}{\partial y}\left(y^2\right)=\sin 2x\cdot(-\sin y)+x\cdot 2y,$$

$$\frac{\partial f}{\partial y}=-\sin 2x\sin y+2xy\cdot$$

The rules work the same way here as it does with functions of one variable:

$\frac{\partial}{\partial y}(g(x,y)+h(x,y))=\frac{\partial g(x,y)}{\partial y}+\frac{\partial h(x,y)}{\partial y}$;

$\frac{\partial}{\partial y}(A(x)r(x,y))=A(x)\frac{\partial r(x,y)}{\partial y}$, where $A(x)$ is constant with respect to *y*;

$\frac{\partial}{\partial y}(y^n)=ny^{n-1}$, where n is integer.

$\frac{\partial}{\partial y}(\cos y)=-\sin y$

Answer: $\frac{\partial f}{\partial y}=-\sin 2x\sin y+2xy$.