Math 208H, Section 1

Quiz number 3 Solutions

Show all work. How you get your answer is just as important, if not more important, than the answer itself. If you think it, write it!

Find the partial derivatives of the function

$$z = f(x, y) = \frac{\cos(xy)}{x + 2y}$$

Applying the chain and quotient rules:

$$\begin{aligned}
\frac{\partial f}{\partial x} &= \frac{(x+2y)\frac{\partial}{\partial x}[\cos(xy)] - (\cos(xy))\frac{\partial}{\partial x}[(x+2y)]}{(x+2y)^2} \\
&= \frac{(x+2y)[(-\sin(xy))(y)] - (\cos(xy))[(1)]}{(x+2y)^2} \\
&= \frac{-y(x+2y)\sin(xy) - \cos(xy)}{(x+2y)^2} \\
&= -\frac{y(x+2y)\sin(xy) + \cos(xy)}{(x+2y)^2}
\end{aligned}$$

$$\begin{aligned}
\frac{\partial f}{\partial y} &= \frac{(x+2y)\frac{\partial}{\partial y}[\cos(xy)] - (\cos(xy))\frac{\partial}{\partial y}[(x+2y)]}{(x+2y)^2} \\
&= \frac{(x+2y)[(-\sin(xy))(x)] - (\cos(xy))[(2)]}{(x+2y)^2} \\
&= \frac{-x(x+2y)\sin(xy) - 2\cos(xy)}{(x+2y)^2} \\
&= -\frac{x(x+2y)\sin(xy) + 2\cos(xy)}{(x+2y)^2}
\end{aligned}$$