1. Find all first and second partial derivatives of the function

\[ f(x, y) = e^{(x^2)} \cos y. \]

Solutions:

\[ f_x = 2xe^{(x^2)} \cos y \]
\[ f_y = -\sin ye^{(x^2)}, \]
\[ f_{xx} = 4x^2e^{(x^2)} \cos y + 2e^{(x^2)} \cos y, \]
\[ f_{yy} = -\cos ye^{(x^2)}, \]
\[ f_{xy} = (f_x)_y = -2 \sin yxe^{(x^2)}, \]
\[ f_{yx} = (f_y)_x = -2 \sin yxe^{(x^2)}. \]

There is a theorem that the last two will be equal whenever they are both continuous.