1. Given the function

\[ f(x) = 2e^{-x^2} \cos(4x), \]

compute \( z_1 = f(x) \) at 100 uniformly spaced values of \( x \) from 0 to 5. Compute \( z_2 = f(x) \) at 20 uniformly spaced values of \( x \) from 0 to 5. Plot \( z_1 \) and \( z_2 \) on the same axes. Use “interp1” to interpolate \( z_2 \) to the same sampling as \( z_1 \) using each of the available methods. Plot each of these interpolations on the previous axes.

2. Given the function

\[ f(x,y) = 4 \cos \left( \frac{\pi}{6} x \right)^2 \cos \left( \frac{\pi}{8} y \right)^2 \sin \left( \frac{\pi}{3} x \right) \sin \left( \frac{\pi}{4} y \right) \]

compute \( z_1 = f(x,y) \) at 10 uniformly spaced values of \( x \) and \( y \) from -3 to 3. Use “interp2” to interpolate to a sampling of 100 uniformly spaced values of \( x \) and \( y \) using each of the available methods. Plot each of these interpolations on the same axes with the original data points.