Problem 1 For this problem consider the function $f(x, y) = x^2 + 4y^2 - 3$.

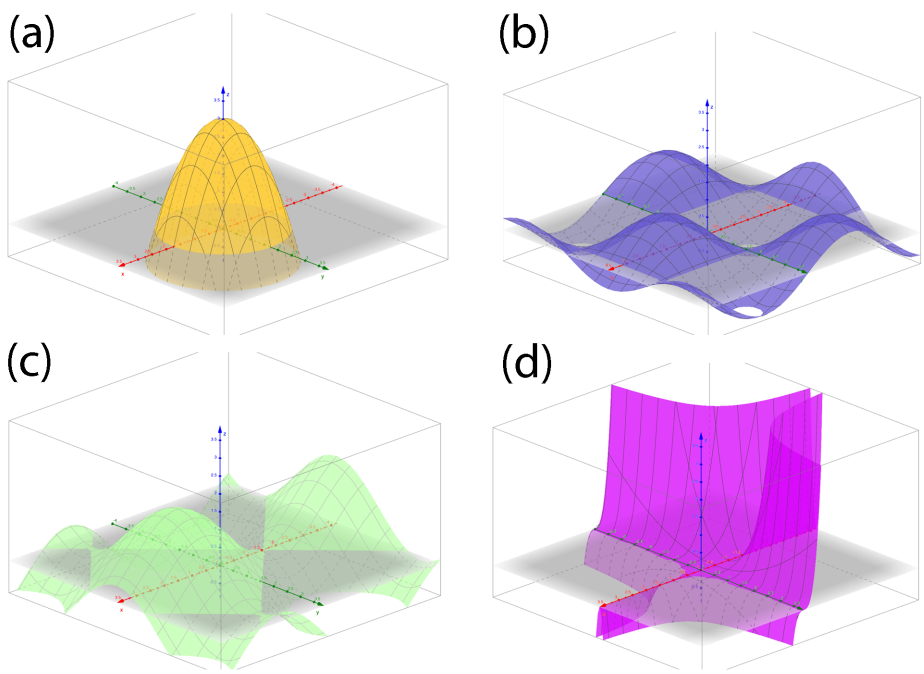
(a) Draw the vertical traces for when $x = 0, 1$ and $y = 0$.

(b) Draw the horizontal traces for when $z = 0, 1, 2$.

(c) Draw the graph of $f(x, y)$.

Problem 2 Match the following functions with their graphs:

1. $a(x, y) = \sin(x)\cos(y)$
2. $b(x, y) = -x^3y^2$
3. $c(x, y) = -x^2 - y^2 + 3$
4. $d(x, y) = \sin(x) + \cos(y)$



Problem 3 Use sine and cosine to parameterize the intersection of the cylinder $x^2 + y^2 = 1$ and the elliptic paraboloid $z = x^2 + 4y^2$.

Problem 4 Draw level curves of the following functions for different values of c and build a contour map for them. Ue your controur map to then sketch the graph of the function.

(a) $f(x, y) = \sqrt{4 - x^2 - y^2}$

(b) $f(x, y) = \dfrac{1}{x^2 + y^2 + 1}$‘