

Q1) Find and sketch the domain of the function $f(x, y) = \frac{\sqrt{x-2} + \sqrt{y-1}}{x-y}$.

Q2) Find the limit, if it exists, or show that the limit does not exist: $\lim_{(x,y) \rightarrow (0,0)} \frac{4y^4 \cos^2 x}{x^4 + y^4}$.

Q3) Find the direction and the value of the maximum rate of change to the function $f(x, y, z) = e^{xy} + \sin(yz) + 2^z$ at the point (1, 0, 2).