Q2:

Define a function g as

$$g(y) = f(1, y)$$

Notice that from the definiton of g

$$\frac{dg}{dy} = D_2 f(1, y)$$

Now we have that

$$g(y) = 1^{1^{1^{1^y}}} + log(1)arctan(arctan(arctan(sin(cos(y) - log(1 + y))))) = 1$$

since $log(1) = 0$ and $1^n = 1$ for all n. Therefore from basic derivatives in 1 dimension we have that $\frac{dg}{dy} = 0 = D_2 f(1, y)$