

## A14. Multivariate Optimization

Consider  $y = f(x, z)$ .

We can obtain first-order conditions using an approach that's very similar to what we did for a function with one variable.

$$\text{Max } f(x, y)$$

$$\text{Focs: } f_x = 0, \quad f_z = 0$$

We won't cover second-order conditions for optimizing  $f(x, y)$  in this course.

[A note for anyone who is curious about the nature of the second order conditions: It turns out that you have to use both "own second derivatives" ( $f_{xx}, f_{zz}$ ) and "cross second derivatives" ( $f_{xz}$ ).]