

§6.4 #17

Find y' : f $x^y = y^x$

$$z = x^y \rightarrow \ln z = \ln(x^y) = y \ln x \rightarrow$$

$$\frac{z'}{z} = y' \ln x + y \left(\frac{1}{x}\right)$$

$$z' = \frac{y}{x} \cdot x^y = y x^{y-1}$$
~~$$z' = \frac{y}{x} \cdot x^y = y x^{y-1}$$~~

$$= \left(y' \ln x + \frac{y}{x}\right) x^y$$

$$z = y^x$$

$$\ln z = x \ln y$$

$$\frac{z'}{z} = \ln y + x \frac{y'}{y} \rightarrow$$

$$z' = \left(\ln y + \frac{x y'}{y}\right) y^x$$

$$\left(y' \ln x + \frac{y}{x}\right) x^y = \left(\ln y + \frac{x y'}{y}\right) y^x, \text{ etc.}$$