Производная

$$y= x^{e^{ctgx } }$$

$$y`= e^{ctgx}\*x^{\left(ctgx-1\right)}\*e^{ctgx}\*\left(- \frac{1}{sin^{2} x }\right)=- \frac{e^{2ctgx}\*x^{\left(ctgx-1\right)}}{sin^{2} x}$$