

Deriva las funciones potenciales-exponenciales:

$$1 \quad f(x) = (\operatorname{sen} x)^{\cos x}$$

$$y = (\operatorname{sen} x)^{\cos x}$$

$$\ln y = \ln (\operatorname{sen} x)^{\cos x} \quad \ln y = \cos x \ln (\operatorname{sen} x)$$

$$\frac{y'}{y} = -\operatorname{sen} x \ln x + \cos x \frac{\cos x}{\operatorname{sen} x}$$

$$f'(x) = \left(-\operatorname{sen} x \ln x + \frac{\cos^2 x}{\operatorname{sen} x} \right) (\operatorname{sen} x)^{\cos x}$$

$$2 \quad f(x) = x^2 \sqrt{\operatorname{arc} \cos x}$$

$$y = (\operatorname{arc} \cos x) x^2$$

$$\ln y = \frac{1}{x^2} \ln \operatorname{arc} \cos x$$

$$\frac{y'}{y} = -\frac{2}{x^3} \ln \operatorname{arc} \cos x - \frac{1}{x^2} \frac{1}{\operatorname{arc} \cos x} \frac{1}{\sqrt{1-x^2}}$$

$$f'(x) = -\frac{1}{x^2} x^2 \sqrt{\operatorname{arc} \cos x} \left(\frac{2}{x} \ln \operatorname{arc} \cos x + \frac{1}{\sqrt{1-x^2} \operatorname{arc} \cos x} \right)$$

$$3 \quad f(x) = \log_{\operatorname{sen} x} x$$

$$y = \log_{\operatorname{sen} x} x \quad (\operatorname{sen} x)^y = x$$

$$\ln (\operatorname{sen} x)^y = \ln x \quad y \cdot \ln (\operatorname{sen} x) = \ln x$$

$$f(x) = \frac{\ln x}{\ln (\operatorname{sen} x)}$$

$$f'(x) = \frac{1}{\ln^2 (\operatorname{sen} x)} \cdot \left(\frac{\ln (\operatorname{sen} x)}{x} - \frac{\cos x}{\operatorname{sen} x} \cdot \ln x \right) =$$

$$= \frac{1}{\ln^2 (\operatorname{sen} x)} \cdot \left(\frac{\ln (\operatorname{sen} x)}{x} - \operatorname{cotg} x \cdot \ln x \right)$$

$$y' = \frac{y^2 - 2xy}{x^2 - 2xy + 2y}$$

$$2 \quad x^2 \operatorname{sen}(x+y) - 5y e^x = 3$$

$$y' = \frac{-[2x \operatorname{sen}(x+y) + x^2 \cos(x+y) - 5y e^x]}{x^2 \cos(x+y) - 5e^x} =$$

$$y' = \frac{2x \operatorname{sen}(x+y) + x^2 \cos(x+y) - 5y e^x}{-x^2 \cos(x+y) + 5e^x}$$