Lecture 12 Activity: Logarithmic Differentiation and Inverse Trig Derivatives

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`math.dartmouth.edu/~blogsdon/activity12.pdf`

1. Differentiate the following functions.
   - 1.1 $x \cdot (\ln x)$
   - 1.2 $\ln(\tan x)$
   - 1.3 $\ln(c \tan x)$
2. Use logarithmic differentiation to differentiate the following functions.
   - 2.1 $\frac{x^2+1}{x-2}$
   - 2.2 $\frac{(x+1)(x-1)\sqrt{x-2}}{x^2+3}$
   - 2.3 $(x^2+5)^{10}\sqrt{\sin x}$
   - 2.4 $\frac{\sin^2 x \cdot \sqrt[3]{e^x}}{x^3-5x^2+4}$
3. Use implicit differentiation to derive a formula for $\frac{d}{dx} \arctan x$. (You can practice by finding derivatives of the other inverse trig functions.)