

Questions? From any part of the course?

Last thing covered
in MAT 201.

Enjoy the good weather we're finally getting!

GIVEN: $\frac{d}{dx} [\ln(x)] = \frac{1}{x}$ LOGARITHMIC DIFFERENTIATION.

$\frac{d}{dx} [\ln(f(x))] = \frac{f'(x)}{f(x)}$ Chain Rule $\frac{d}{dx} \ln(f(x)) = \frac{d \ln(f(x))}{d f(x)} \cdot \frac{d f(x)}{dx}$

$\frac{d}{dx} [\cos(x)^{x^2}]$ $\ln(A^B) = B \ln(A)$ is property of logs we exploit to handle derivative of $f(x)^{g(x)}$ situation.

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

$\frac{d}{dx} [\ln(y) = \ln(\cos(x)^{x^2}) = x^2 \ln(\cos(x))]$

$\frac{y'}{y} = 2x \ln(\cos(x)) + x^2 \cdot \frac{-\sin(x)}{\cos(x)}$

$y' = [2x \ln(\cos(x)) - x^2 \tan(x)] y$

$y' = [2x \ln(\cos(x)) - x^2 \tan(x)] (\cos(x))^{x^2} = \frac{d}{dx} [\cos(x)^{x^2}]$