Math 180 / David Dumas / Fall 2014

Solution and Rubric for Quiz 6 (Mon Oct 6)

Problem: Compute the derivative of $\frac{1}{\ln(1+x^2)}$.

Solution:

First notice that the chain rule allows us to calculate

$$\frac{d}{dx}\ln(1+x^2) = \frac{d}{dx}\ln(u) = \frac{1}{u}\frac{du}{dx} = \frac{2x}{1+x^2}.$$

The problem itself is another application of the chain rule, where now we write $v = \ln(1 + x^2)$.

$$\frac{d}{dx}\frac{1}{\ln(1+x^2)} = \frac{d}{dx}v^{-1} = -v^{-2}\frac{dv}{dx} = \frac{-1}{(\ln(1+x^2))^2}\frac{2x}{1+x^2} = \frac{-2x}{(1+x^2)(\ln(1+x^2))^2}$$

The problem can also be solved using the quotient rule or the reciprocal rule.

Rubric:

- Correct answer fully supported by clear and correct work: 2 points
- If the chain rule was applied correctly, but there was a minor simplification error (e.g. correct answer followed by incorrect simplification) or a single sign error in applying the quotient rule, reciprocal rule, etc., but no other mistakes: 1 point
- Otherwise: 0 points