Common Calculus Mistakes

Chain Rule: Power Rule

The Goal

Find

$$\frac{d}{dx}(1+e^x)^{\frac{1}{3}}$$

The Mistake

Find the mistake:

$$\frac{d}{dx}(1+e^x)^{\frac{1}{3}} = \frac{1}{3}(1+e^x)^{-\frac{1}{3}}e^x$$

Need a hint? Look carefully at the red part:

$$\frac{d}{dx}(1+e^x)^{\frac{1}{3}} = \frac{1}{3}(1+e^x)^{-\frac{1}{3}}e^x$$

The Correction

$$\frac{d}{dx}(1+e^x)^{\frac{1}{3}} = \frac{1}{3}(1+e^x)^{-\frac{2}{3}}e^x$$

An Explanation

Take care when subtracting fractions, especially when negative numbers are involved. In this case the result of 1/3 - 1 is 1/3 - 3/3 = (1-3)/3 = -2/3.