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# Common Calculus Mistakes

## Example: Product Rule/Constant Multiple

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### The Goal

Find

$$\frac{d}{dx}(2^x - 3 \cdot 6^x)$$

### The Mistake

Find the mistake:

$$\frac{d}{dx}(2^x - 3 \cdot 6^x) = 2^x \cdot \ln 2 - (6^x + 6^x \cdot \ln 6 \cdot 3)$$

Need a hint? Look carefully at the red part:

$$\frac{d}{dx}(2^x - 3 \cdot 6^x) = 2^x \cdot \ln 2 - (6^x + 6^x \cdot \ln 6 \cdot 3)$$

### The Correction

$$\frac{d}{dx}(2^x - 3 \cdot 6^x) = \ln 2 \cdot 2^x - 3 \ln 6 \cdot 6^x$$

### An Explanation

An attempt to use the product rule was made despite the fact that the constant multiple rule would have sufficed. The mistake was in computing the derivative of the constant 3 to be 1 (resulting in the term  $6^x$ ); the derivative of 3 is 0, which eliminates that  $6^x$  term.