The following is an extreme example of a mistake frequently made on the exam. My hope is that by finding the error here, you will not repeat it in the future. So the question to answer for extra credit is: Where does the following argument go wrong? Explain (and take out your red pen if you wish).

No one would dispute that $1 = 1 \times 1$; in fact most would agree that for any integer $n$, $1 = 1^n = 1 \times \cdots \times 1$. Also most people would believe that

$$\int 1 \, dx = x + c.$$  

Since $1 = 1 \cdot 1$, we could find the above integral as follows:

$$\int 1 \, dx = \int 1 \cdot 1 \, dx = x \cdot x + c = x^2 + c.$$  

Why stop there? Since $1 = 1^n$, for all integers $n > 1$ we also have:

$$\int 1 \, dx = \int 1^n \, dx = \int 1 \cdot 1 \cdots 1 \, dx = x \cdot x \cdots x + c = x^n + c.$$  

Thus,

$$x + c = \int 1 \, dx = x^n + c$$  

and so for all $n \geq 1$

$$x + c = x^n + c.$$