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1 | My Common Mistakes

$$-x^{-2} \neq \int x^{-1} = \int \frac{1}{x} = \ln x$$

$$\frac{1}{x} \neq \int \ln x = x \ln x - x$$

$$\int x^{-k} = \frac{1}{-k+1} x^{-k+1} \neq \frac{1}{-(k+1)} x^{-(k+1)}$$

$$\text{e.g. } \int x^{-2} = -x^{-1} \neq -\frac{1}{3} x^{-3} \lim_{n \to \infty} \frac{n}{n+1} = 1 \neq 0$$

$$\frac{\partial}{\partial x} a^x = \frac{\partial}{\partial x} e^{x \ln a} = e^{x \ln a} \ln a = a^x \ln a.$$

Exponentials: when in doubt, write $a^b = e^{b \ln a}$

$$\frac{\partial}{\partial x} x^{f(x)} = ?$$

$$\sum x^k = \frac{1}{1-x} \neq \frac{1}{1+x} = \sum (-1)^k x^k$$
