Properties of ANTIderivatives

Recall that we use the notation $\int \boldsymbol{f(x)}\,\mathbf{d}\boldsymbol{x}$ to designate the **set** or **family** of **all** antiderivatives of f. The table below mirrors the table that we had for derivatives. The symbol C always represents an arbitrary constant.

Linearity Rule #1	$\int \Big(f(x) \pm g(x)\Big)\,\mathrm{d}x = \int f(x)\,\mathrm{d}x \pm \int g(x)\,\mathrm{d}x$
Linearity Rule #2	$\int \Big(c \cdot f(x)\Big)\,\mathrm{d}x = c \cdot \int f(x)\,\mathrm{d}x$
1. Constant Function Rule	$\int k\,\mathrm{d}x = kx + C$, where k is a constant
2. Power Rule	$\int x^n\,\mathrm{d}x = \dfrac{1}{n+1}x^{n+1} + C$, for $n \neq -1$
3. $\boldsymbol{f(x) = \dfrac{1}{x} = x^{-1}}$	$\int x^{-1}\,\mathrm{d}x = \ln\lvert x\rvert + C$
4. Exponential Function Rule	$\int a^x\,\mathrm{d}x = \dfrac{1}{\ln a}a^x + C$
4'. Exponential Function Rule	$\int e^x\,\mathrm{d}x = e^x + C$
5. Sine Function	$\int \sin x\,\mathrm{d}x = -\cos x + C$
5'. Cosine Function	$\int \cos x\,\mathrm{d}x = \sin x + C$
6. Arcsine Function	$\int \dfrac{1}{\sqrt{1-x^2}}\,\mathrm{d}x = \arcsin x + C$
7. Arctangent Function	$\int \dfrac{1}{1+x^2}\,\mathrm{d}x = \arctan x + C$