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### Power and exponential functions

In what follows,  $r$ ,  $k$ , and  $b$  are *constants*.

$$\int k \, dx = kx + C$$

$$\int x^r \, dx = \frac{1}{r+1} x^{r+1} + C$$

$$\int \frac{1}{x} \, dx = \ln |x| + C$$

$$\int e^x \, dx = e^x + C$$

$$\int e^{kx} \, dx = \frac{1}{k} e^{kx} + C$$

$$\int b^x \, dx = \frac{1}{\ln b} b^x + C$$

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# Memorize These Integrals!!

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### Trigonometric derivatives “backwards”

$$\int \sin x \, dx = -\cos x + C$$

$$\int \cos x \, dx = \sin x + C$$

$$\int \sec^2 x \, dx = \tan x + C$$

$$\int \csc^2 x \, dx = -\cot x + C$$

$$\int \sec x \tan x \, dx = \sec x + C$$

$$\int \csc x \cot x \, dx = -\csc x + C$$

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### Hyperbolic derivatives “backwards”

(Can look up signs for last four.)

$$\int \sinh x \, dx = \cosh x + C$$

$$\int \cosh x \, dx = \sinh x + C$$

$$\int \operatorname{sech}^2 x \, dx = \tanh x + C$$

$$\int \operatorname{csch}^2 x \, dx = -\operatorname{coth} x + C$$

$$\int \operatorname{sech} x \tanh x \, dx = -\operatorname{sech} x + C$$

$$\int \operatorname{csch} x \operatorname{coth} x \, dx = -\operatorname{csch} x + C$$

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### Inverse trig derivatives “backwards”

$$\int \frac{1}{\sqrt{1-x^2}} \, dx = \sin^{-1} x + C$$

$$\int \frac{1}{1+x^2} \, dx = \tan^{-1} x + C$$

$$\int \frac{1}{|x|\sqrt{x^2-1}} \, dx = \sec^{-1} x + C$$

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### Inverse hyperbolic derivs “backwards”

(Recognize, but can look up to verify.)

$$\int \frac{1}{\sqrt{x^2+1}} \, dx = \sinh^{-1} x + C$$

$$\int \frac{1}{\sqrt{x^2-1}} \, dx = \cosh^{-1} x + C$$

$$\int \frac{1}{1-x^2} \, dx = \tanh^{-1} x + C$$

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