$\int$ Antiderivative

$$\begin{array}{ccc} f & & x^2 \\ \boxed{\downarrow} & \text{der} & \downarrow \\ f' & & 2x \end{array}$$

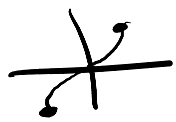
$$\int 2x \, dx \overset{c}{=} x^2 \qquad \int \sin x \, dx \overset{c}{=} -\cos x$$

$$\int e^x dx = e^x + c \qquad \int \cos x \, dx \overset{c}{=} \sin x$$

$$\int \frac{1}{1+x^2} dx \overset{c}{=} \arctan x$$

$$\int 2x \, dx = \underline{x^2 + c} \qquad \underline{x \in \mathbb{R}}$$

$$\int \frac{1}{\sqrt{1-x^2}} dx = \arcsin x$$



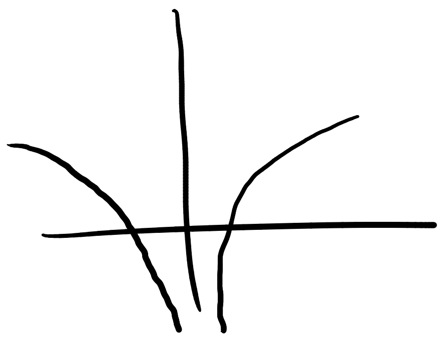
$$\underline{x \in (-1,1)} \qquad \cancel{x \in [-1,1]} \qquad 1-x^2 > 0$$

$$1 > x^2$$

$$\int \frac{1}{x} dx = \underline{\ln|x| + c}$$

$$x \in (-\infty, 0)$$

$$x \in (0, \infty)$$



$$n \neq -1$$

$$\int x^n dx = \frac{x^{n+1}}{n+1}$$

$$\int x^3 dx \overset{c}{=} \frac{x^{3+1}}{3+1} = \frac{x^4}{4}$$

$$\int \sqrt{x} \, dx = \int x^{1/2} dx \overset{c}{=} \frac{x^{1/2+1}}{\frac{1}{2}+1} = \frac{x^{3/2}}{\frac{3}{2}} = \frac{2}{3}\sqrt{x^3}$$

$$x \in (\cancel{[}0, \infty)$$

$$\int \frac{1}{x^2}\,dx = \int x^{-2}\,dx \overset{c}{=} \frac{x^{-2+1}}{-2+1} = \frac{x^{-1}}{-1} = \frac{-1}{x}$$

$x \in (-\infty, 0)\ ,\ (0, \infty)$

$$\int 2e^x - \frac{1}{3}\frac{1}{\cos^2 x}\,dx = 2e^x - \frac{1}{3}\tan x + C$$

$$2\int e^x\,dx \quad - \frac{1}{3}\int \frac{1}{\cos^2 x}\,dx$$

$x \in \left(-\frac{\pi}{2}, \frac{\pi}{2}\right) + k\pi$

$C \in \mathbb{R}$

$$\int \cos(x+7)\,dx \overset{c}{=} \sin(x+7) \checkmark$$

$$\overset{?}{=} (\sin(x+7))' = \cos(x+7)$$

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

$$\int \cos(2x+7)\,dx \overset{c}{=} \frac{\sin(2x+7)}{2}$$

$$\left(\frac{1}{2}\sin(2x+7)\right)' = \frac{1}{2}\cos(2x+7)\cdot 2$$

$$= \frac{2\cos(2x+7)}{2}$$

$\rightarrow \frac{1}{2}\sin(2x+7)$

$ax+b$

$2x+7$

$-x$

$-\frac{x}{8} - \pi \checkmark$

$\cancel{x^2}$

$\cancel{\frac{1}{x}}$

$\cancel{\sqrt{x}}$

$$\int \frac{1}{1+x^2}\,dx \overset{c}{=} \arctan x$$

$$\int \frac{1}{1+(4x)^2}\,dx \overset{c}{=} \frac{1}{4}\arctan(4x) \checkmark$$

$$\int \frac{1}{1+16x^2}\,dx = \frac{1}{4}\arctan(4x)$$