$$(u \cdot v)' = u'v + uv'$$

$$u \cdot v = \int u'v\,dx + \int uv'\,dx$$

$$\int (2x^2+3x-1)\cdot \sin(5x)\,dx =$$

$$4x+3$$

$$4$$

$$\int e^{2x} \cdot \sin(-3x)\,dx = \ldots$$

$$\int e^{2x}\,dx = \frac{e^{2x}}{2} + C$$

$$\int \sin(-3x)\,dx = \frac{-\cos(-3x)}{-3} + C$$

$$\int \cos(2t)\,dt = \left| \begin{array}{c} a = 2t \\ 1\,da = 2\,dt \\ dt = \frac{1}{2}\,da \end{array} \right| = \int \cos a \cdot \frac{1}{2}\,da$$

$$= \frac{1}{2} \cdot \int \cos a\,da = \frac{1}{2} \cdot \sin a + C = \frac{1}{2} \cdot \sin(2t) + C$$

$$\int f(ax+b)\,dx = \left| \begin{array}{l} t = ax+b \\ dt = a \cdot dx \\ dx = \frac{1}{a} \cdot dt \end{array} \right| =$$

$$= \int f(t) \cdot \frac{1}{a} dt = \frac{1}{a} \cdot F(ax+b) + C$$

$$\int \sin(\boxed{3x+14})\,dx = \frac{1}{3}\cdot\left(-\cos(3x+14)\right)$$

$$+C$$

$$\int \frac{f'(x)}{f(x)}\,dx = \left| \begin{array}{l} t = f(x) \\ 1\,dt = f'(x)\,dx \end{array} \right| = \int \frac{1}{t}\,dt =$$

$$= \ln|t| + C = \underline{\underline{\ln|f(x)| + C}}$$

$$\int \frac{6x^2+4x+2}{x^3+x^2+x+1}\,dx = 2\cdot\int \frac{3x^2+2x+1}{x^3+x^2+x+1}\,dx$$

$$= 2\cdot \ln\left|x^3+x^2+x+1\right| + c$$

$$\int \frac{1}{x^2+x+1}\,dx = \int \frac{1}{\left(x+\frac{1}{2}\right)^2-\frac{1}{4}+1}\,dx =$$

$$\left(D = 1-4\cdot 1\cdot 1 < 0\right)$$

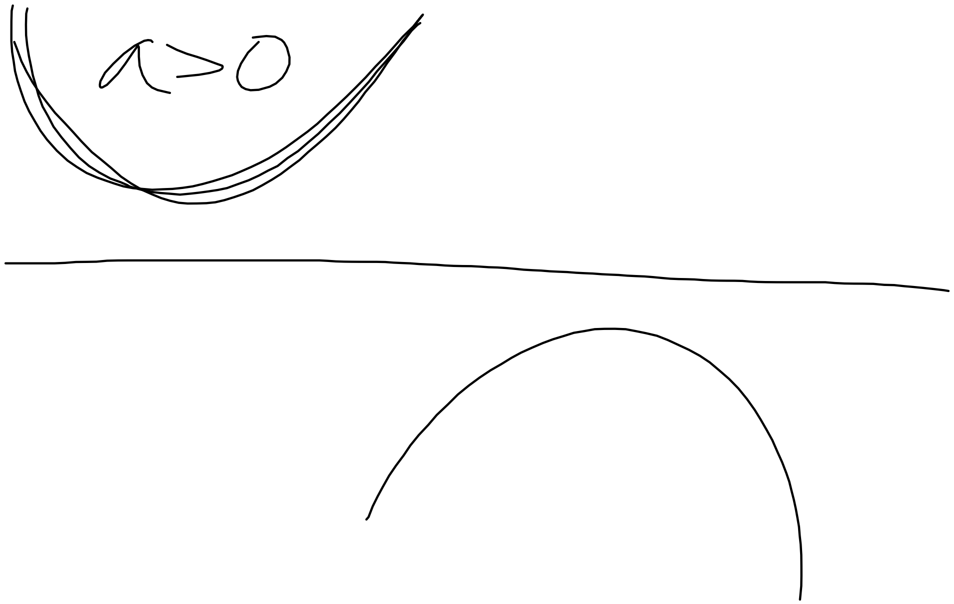
$$= \int \frac{1}{\left(x+\frac{1}{2}\right)^2+\boxed{\frac{3}{4}}}\,dx =$$

$$= \int \frac{1}{\frac{3}{4} \cdot \left[\frac{\left(x+\frac{1}{2}\right)^2}{\frac{3}{4}} + 1 \right]} \, dx =$$

$$= \frac{4}{3} \cdot \int \frac{1}{\left(\frac{x+\frac{1}{2}}{\sqrt{\frac{3}{4}}} \right)^2 + 1} \, dx = \frac{4}{3} \cdot \int \frac{1 \cdot dx}{\left(\frac{x+\frac{1}{2}}{\frac{\sqrt{3}}{2}} \right)^2 + 1} =$$

$$= \frac{4}{3} \cdot \int \frac{1}{\left(\frac{2x+1}{\sqrt{3}}\right)^2 + 1}\, dx = \left| \begin{array}{l} t = \frac{2x+1}{\sqrt{3}} = \frac{2}{\sqrt{3}} \cdot x + \frac{1}{\sqrt{3}} \\ 1 \cdot dt = \frac{2}{\sqrt{3}} dx \\ dx = \frac{\sqrt{3}}{2} dt \end{array} \right|$$

$$= \frac{4}{3} \cdot \int \frac{1}{t^2+1} \cdot \frac{\sqrt{3}}{2}\, dt = \frac{4}{3} \cdot \frac{\sqrt{3}}{2} \cdot \arctan t + C = \frac{2}{\sqrt{3}} \cdot \arctan \frac{2x+1}{\sqrt{3}} + C$$


a>0

$$\int \frac{f'}{(f)^3}\,dx = \left| \begin{array}{l} t = f(x) \\ dt = f'(x)\,dx \end{array} \right| =$$

$$= \int \frac{1}{t^3}\,dt = \frac{t^{-2}}{-2} + c = -\frac{1}{2} \cdot f^{-2}(x) + c$$