$$\int \frac{f'}{f}\,dx = \ln|f| + C$$

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

$$\int \frac{1}{t^2+4}\,dt =$$

$$\boxed{\int \frac{1}{x^2+A^2}\,dx}$$

$$= \frac{1}{4}\cdot\int \frac{1}{\underbrace{\frac{t^2}{4}}_{=\left(\frac{t}{2}\right)^2}+1}\,dt = \left| \begin{array}{l} u=\frac{t}{2}\\ du=\frac{1}{2}\,dt \\ dt = 2\cdot du\end{array}\right| = \frac{1}{4}\int\frac{1}{u^2+1}\cdot 2\cdot du$$

$$\int \frac{1}{(1+s^2)^3}\,ds = \frac{s}{2\cdot(3-1)\cdot(1+s^2)^{3-1}} + \frac{2\cdot 3-3}{2\cdot 3-2}\cdot \underbrace{\int \frac{1}{(1+s^2)^2}\,ds}$$

$$\int \frac{1}{1+s^2}\,ds = \arctan s$$

$$Q(x) = \frac{2x^{14}+5x^{13}+3x^{12}-10x^{11}-22x^{10}+11x^{9}+116x^{8}+298x^{7}+504x^{6}+975x^{5}+1440x^{4}+2220x^{3}+1744x^{2}+1280x+128}{(x+1)\cdot(x-2)^2\cdot(x^2+2x+2)\cdot(x^2-x+1)\cdot(x^2+x+2)^3} =$$

$$= 2x+3-\frac{4}{x+1}+\frac{5}{(x-2)^2}-\frac{7}{x^2+2x+2}+\frac{2x+5}{x^2-x+1}+\frac{2-3x}{(x^2+x+2)^3}$$

$$\boxed{\int Q(x)\,dx = ?}$$

$$\int 2x+3\,dx = 2\frac{x^2}{2} + 3x + c_1$$

$$\int \frac{4}{x+1}\,dx = 4\cdot\int \frac{1}{x+1}\,dx = \left| \int \frac{f'}{f}\,dx = \ln|f| + c \right| = 4\cdot\ln|x+1| + c_2$$

$$\int \frac{5}{(x-2)^2}\,dx = \left| \begin{matrix} t = x-2 \\ dt = dx \end{matrix} \right| = \int \frac{5}{t^2}\,dt = 5\cdot\int t^{-2}\,dt =$$

$$= 5\cdot\frac{t^{-1}}{-1} + c_3 = \frac{-5}{x-2} + c_3$$

$$\int \frac{7}{x^2+2x+2}\,dx = \int \frac{7}{(x+1)^2-1+2}\,dx = \int \frac{7}{\underline{(x+1)}^2+1}\,dx =$$

$$= \left| \begin{array}{l} t = x+1 \\ dt = dx \end{array} \right| = 7 \cdot \int \frac{1}{t^2+1}\,dt = 7 \cdot \operatorname{arctg} t + c_1 =$$

$$= \underline{7 \cdot \operatorname{arctg}(x+1) + c_1}$$

$$\int \frac{2x+5}{x^2-x+1}\,dx = \int \frac{2x-1+1+5}{x^2-x+1}\,dx =$$

$$(x^2-x+1)' = 2x-1$$

$$= \int \underbrace{\frac{2x-1}{x^2-x+1}}_{\frac{f'}{f}} + \frac{6}{x^2-x+1}\,dx = \underbrace{\ln|x^2-x+1|} + 6\cdot\underbrace{\int \frac{1}{x^2-x+1}\,dx}_{I_P} =$$

$$= \ldots$$

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

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

$$= \frac{1}{\sqrt{\frac{3}{4}}} \cdot \operatorname{arctg} \frac{x-\frac{1}{2}}{\sqrt{\frac{3}{4}}} + C_p$$

$$\int \frac{2-3x}{(x^2+x+2)^3}\,dx = -3\cdot\int \frac{x-\frac{2}{3}}{(\dots)^3}\cdot\frac{2}{2}\,dx = -\frac{3}{2}\cdot\int\frac{2x-\frac{4}{3}}{(\dots)^3}\,dx =$$

$$\boxed{2x+1}$$

$$= -\frac{3}{2}\cdot\int\frac{2x+1-1-\frac{4}{3}}{(\dots)^3}\,dx = -\frac{3}{2}\underbrace{\int\frac{2x+1}{(x^2+x+2)^3}\,dx}_{=:I_7} - \frac{3}{2}\underbrace{\int\frac{-\frac{7}{3}}{(x^2+x+2)^3}\,dx}_{I_8}$$

$$I_7 = \int \frac{2x+1}{(x^2+x+2)^3}\,dx = \left| \begin{array}{l} t = x^2+x+2 \\ \underline{\underline{1}}\,dt = \underline{\underline{(2x+1)}}\,dx \end{array} \right| =$$

$$= \int \frac{1}{t^3}\,dt = \int t^{-3}\,dt = \frac{t^{-2}}{-2} + C_7 =$$

$$= -\frac{1}{2\cdot(x^2+x+2)^2} + C_7$$

$$I_8 = \int \frac{1}{(x^2+x+2)^3}\,dx = \int \frac{1}{\left[\left(x+\frac{1}{2}\right)^2 - \frac{1}{4} + 2\right]^3}\,dx =$$

$$\boxed{\left(t^2+1\right)^3}$$

$$= \int \frac{1}{\left[\left(x+\frac{1}{2}\right)^2 + \frac{7}{4}\right]^3}\,dx = \int \frac{1}{\left[\frac{7}{4}\cdot\left\{\frac{\left(x+\frac{1}{2}\right)^2}{\frac{7}{4}} + 1\right\}\right]^3}\,dx =$$

$$= \frac{1}{\left(\frac{7}{4}\right)^3}\cdot\int \frac{1}{\left[\left(\frac{x+\frac{1}{2}}{\frac{\sqrt{7}}{2}}\right)^2 + 1\right]^3}\,dx = \left| \begin{array}{l} t = \dfrac{x+\frac{1}{2}}{\frac{\sqrt{7}}{2}} = \dfrac{2x+1}{\sqrt{7}} \\ dt = \dfrac{2}{\sqrt{7}}\,dx \Rightarrow dx = \dfrac{\sqrt{7}}{2}\,dt \end{array} \right| =$$

$$= \frac{1}{\left(\frac{7}{4}\right)^3} \int \frac{1}{(t^2+1)^3} \cdot \frac{\sqrt{7}}{2}\, dt = \underbrace{\frac{\sqrt{7}}{2} \cdot \left(\frac{4}{7}\right)^3}_{A} \cdot \int \frac{1}{(t^2+1)^3}\, dt$$

$$= A \cdot \left(\frac{t}{2 \cdot 2 \cdot (1+t^2)^2} + \frac{3}{4} \cdot \int \frac{1}{(t^2+1)^2}\, dt \right)$$

$$R(\sin x, \cos x) = \frac{3\sin^2 x - 4\cdot\cos x}{5\cdot\cos^3 x + 7\cdot\cos^2 x\cdot\sin x}$$

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

$$\int \underbrace{\sin^2 x}_{=1-\cos^2 x = 1-t^2} \cdot \cos^2 x \cdot \sin x \, dx = \left| \begin{array}{l} \cos x = t \\ -\sin x \, dx = dt \\ \sin x \, dx = -dt \end{array} \right| =$$

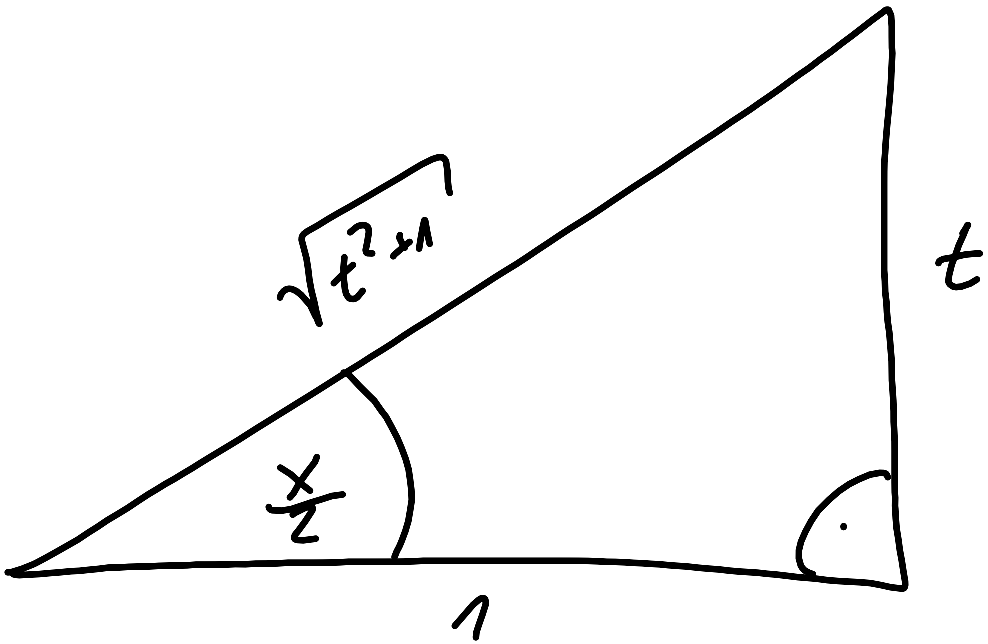
$$\int (1-t^2) \cdot t^2 \cdot (-1) \, dt = \dots$$

$$\sin^6 x = (\sin^2 x)^3 = (1 - \cos^2 x)^3 =$$

$$= (1 - t^2)^3$$

$$t = f(x)$$

$$x = f^{-1}(t) \Rightarrow dx = \ldots$$



$\sqrt{t^2+1}$
t
$\frac{x}{2}$
1

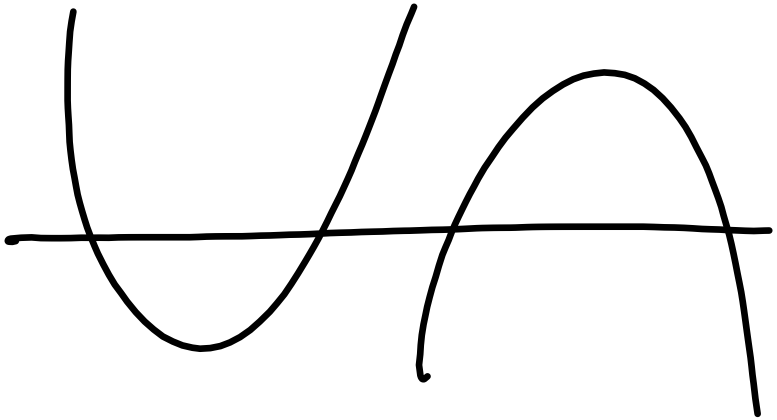
$$\sin(2\alpha) = 2 \cdot \sin\alpha \cdot \cos\alpha$$

$$\cos(2\alpha) = \cos^2\alpha - \sin^2\alpha$$

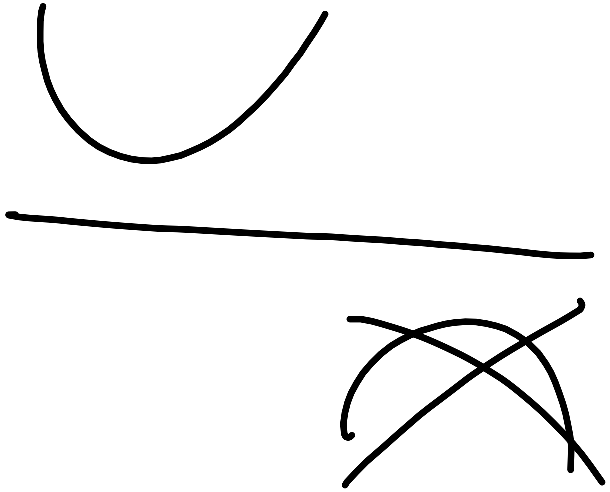
$$\int \frac{4\cdot\sqrt[5]{x}-7\cdot\sqrt[3]{x}}{\sqrt{x}+x+4\sqrt[15]{x}}\,dx = \left|\begin{array}{l} 5,3,2,1,15 \\ nsn = 30 \\ x = t^{30} \end{array}\right| \begin{array}{l} dx = \\ = 30\cdot t^{29}dt \end{array}$$

$$\int \frac{4\cdot t^{\frac{30}{5}} - 7\cdot t^{\frac{30}{3}}}{t^{\frac{30}{2}}+t^{30}+4\cdot t^{\frac{30}{15}}}\cdot 30\cdot t^{29}\,dt = \int \frac{4\cdot t^{6}-7\cdot t^{10}}{t^{15}+t^{30}+4\cdot t^{2}}\cdot 30\cdot t^{29}\,dt$$

ax^2+bx+c



koř. v $\mathbb{C}$ / $D<0$



$$\sqrt{x^2 - x + 1} = x - t \quad /^2$$

$$\cancel{x^2} - x + 1 = \cancel{x^2} - 2xt + t^2$$

$$2xt - x = t^2 - 1$$

$$x = \frac{t^2 - 1}{2t - 1}$$

$$\sqrt{x^2-x+1} = xt+1 \quad \Big/^2$$

$$x^2 - x + \cancel{1} = x^2t^2 + 2xt + \cancel{1} \quad \Big/ \cdot \frac{1}{x}$$

$$x - 1 = xt^2 + 2t$$

$$x - xt^2 = 2t + 1$$

$$x = \frac{2t+1}{1-t^2}$$

$$\sqrt{-x^2+3x-2} = (x-1)\,t \quad /^2$$

$$\underbrace{-x^2+3x-2} = (x-1)^2\cdot t^2$$

$$(-1)\cdot\cancel{(x-1)}\cdot(x-2) = (x-1)^{\cancel{2}}\cdot t^2$$

$$p \notin \mathbb{Z}$$

$$\frac{n+1}{n} = \frac{0+1}{4} = \frac{1}{4} \notin \mathbb{Z}$$

$$\int \sin x^2 \, dx$$

SPOJ. FCE

$$\int_{-\infty}^{\infty} e^{-x^2}\,dx$$