$$\begin{matrix} a_1 & b_1 & c_1 & d_1 & z_1 \\ a_2 & b_2 & c_2 & d_2 & z_2 \\ a_3 & b_3 & c_3 & d_3 & z_3 \\ a_4 & b_4 & c_4 & d_4 & z_4 \end{matrix}$$

$$\frac{a_1}{a_1} \quad \frac{b_1}{a_1} \quad \frac{c_1}{a_1} \quad \frac{d_1}{a_1} \quad \frac{z_1}{a_1} \qquad \tilde{a}_{ki} = \frac{a_2}{a_1}$$

$$a_2 - a_2 \cdot 1 \; . \; b_2 - a_2 \cdot \frac{b_1}{a_1} \; . \; .$$

8.3.10 $\displaystyle\int \frac{dx}{(x^2-4x+29)^2} = \left[\begin{array}{l} x^2-4x+29=0 \\ D=(-4)^2-4\cdot 29=-100 \end{array}\right] =$

IV тип простейшей дроби

$= \left[\begin{array}{l} a=0, B=-41, \\ p=-4, q=29; \end{array}\right. \quad y = x+\frac{p}{2} = x-2 \; ; \; a=\sqrt{q-\frac{p^2}{4}} = \sqrt{29-4}=5$

$\left. x^2-4x+29 = y^2+5^2 \right] = \displaystyle\int \frac{dy}{(y^2+5^2)^2} = \left[\int \frac{dy}{(y^2+a^2)^n} = \right.$

$\left. = \displaystyle\frac{1}{2(n-1)a^2} \cdot \frac{y}{(y^2+a^2)^{n-1}} + \frac{1}{a^2} \cdot \frac{2n-3}{2n-2} \int \frac{dy}{(y^2+a^2)^{n-1}} \right] =$

$= \displaystyle\frac{1}{2(2-1)\cdot 5^2} \cdot \frac{y}{(y^2+5^2)^{2-1}} + \frac{1}{5^2} \cdot \frac{2\cdot 2-3}{2\cdot 2-2} \cdot \int \frac{dy}{(y^2+5^2)^{2-1}} =$

$= \displaystyle\frac{1}{50} \cdot \frac{y}{(y^2+25)} + \frac{1}{50} \int \frac{dy}{y^2+5^2} = \frac{y}{50(y^2+25)} + \frac{1}{50} \cdot$

$\cdot \displaystyle\frac{1}{5} \cdot \mathrm{arctg}\, \frac{y}{5} + C = \frac{x-2}{50((x-2)^2+25)} + \frac{1}{250} \cdot \mathrm{arctg}\, \frac{x-2}{5} + C$

8.3.11 $\displaystyle\int \frac{3x-2}{(x^2+6x+10)^2}\, dx = \left[\begin{array}{l} x^2+6x+10 \\ D = 36-40 = -4 \Rightarrow \text{Нет корней} \Rightarrow \end{array}\right.$

$\Rightarrow$ 4 тип простейшей дроби

$\left.\begin{array}{l} A=3, \; B=-2, \\ p=6, \; q=10; \quad Ax+B = \frac{A}{2}(2x+p)+\left(B-\frac{Ap}{2}\right) \Rightarrow \\ 3x-2 = \frac{3}{2}(2x+6)-11 \end{array}\right] = \displaystyle\int \frac{\frac{3}{2}(2x+6)-11}{x^2+6x+10^2}\, dx =$

$= \displaystyle\frac{3}{2}\int \frac{2x+6}{(x^2+6x+10)^2}\, dx - 11 \int \frac{dx}{(x^2+6x+10)^2} = \left[\begin{array}{l} 1)\; t = x^2+6x+10 \Rightarrow \\ dt = (2x+6)\, dx \end{array}\right.$

$2)\; y = x+\frac{6}{2} = x+3, \; a = \sqrt{10-\frac{6^2}{4}} = \sqrt{1} = 1 = \displaystyle\frac{3}{2}\int \frac{dt}{t^2} - 11 \int \frac{dy}{(y^2+1)^2}$

$= \Big[$ 1) $\int x^{\alpha}\,dx = \frac{x^{\alpha+1}}{\alpha+1} + C$ 2) рекуррентная формула для понижения степени $\Big] = \frac{3}{2}\int\frac{dt}{t^2} - 11\left(\frac{3}{2(2-1)\cdot 1^2}\cdot\frac{y}{(y^2+1)^{2-1}} + \frac{2\cdot 1-3}{2\cdot 1-2}\cdot\int\frac{dy}{(y^2+1^2)^{2-1}}\right) = \frac{3}{2}\int\frac{dt}{t^2} - 11\left(\frac{y}{2(y^2+1)} + \frac{1}{2}\cdot\int\frac{dy}{y^2+1^2}\right) = \frac{3}{2}\cdot\frac{t^{-2+1}}{-2+1} - 11\left(\frac{y}{2(y^2+1)} + \frac{1}{2}\cdot \operatorname{arctg} y\right) + C =$

$= -\frac{3}{2(x^2+6x+10)} - 11\left(\frac{x+3}{2((x+3)^2+1)} + \frac{1}{2}\operatorname{arctg}(x+3)\right) + C =$

$= -\frac{3}{2(x^2+6x+10)} - \frac{11(x+3)}{2(x^2+6x+10)} + \frac{11}{2}\operatorname{arctg}(x+3) + C$

8.3.13

$\int\frac{2x-3}{(x-5)(x+2)}\,dx = \Big[(x-5)(x+2)=0$ есть корни $\frac{A}{x-5} + \frac{B}{x+2}$; $\frac{2x-3}{(x-5)(x+2)} =$

$= \frac{A(x+2)+B(x-5)}{(x-5)(x+2)}$ $\quad A=1,\ B=1 \Rightarrow \frac{2x-3}{(x-5)(x+2)} = \frac{1}{x-5} + \frac{1}{x+2}\Big] =$

$= \int\left(\frac{1}{x-5} + \frac{1}{x+2}\right)dx = \int\frac{dx}{x-5} + \int\frac{dx}{x+2} =$

$= \ln|x-5| + \ln|x+2| + C = \ln|(x-5)(x+2)| + C$

8.3.14

$\int\frac{x+2}{x^2-6x+5}\,dx = \Big[\begin{matrix} x^2-6x+5=0 \\ x_1+x_2=6 \\ x_1\cdot x_2=5\end{matrix}\Big| \Rightarrow x_1=5,\ x_2=1 \Rightarrow$

$\Rightarrow x^2-6x+5 = (x-5)(x-1)\Big] = \int\frac{x+2}{(x-5)(x-1)}\,dx =$

$= \Big[\frac{x+2}{(x-5)(x-1)} = \frac{A}{x-5} + \frac{B}{x-1}$; $A(x-1)+B(x-5)$

$Ax - A + Bx - 5B \qquad x(A+B) - 5B - A$

$\begin{cases} A+B=1 \\ -5B-A=2 \end{cases} \Rightarrow \begin{cases} A=1-B, \\ -5B-1+B=2 \end{cases} \begin{cases} A=1-B, \\ -4B=3 \end{cases} \begin{cases} A=\frac{7}{4} \\ B=-\frac{3}{4} \end{cases}$

$\Rightarrow \frac{x+2}{(x-5)(x-1)} = \frac{7/4}{x-5} - \frac{3/4}{x-1}\Big] = \frac{7}{4}\int\frac{dx}{x-5} - \frac{3}{4}\int\frac{dx}{x-1} =$

$= \frac{7}{4}\ln|x-5| - \frac{3}{4}\ln|x-1| + C$