$$\int u\,dv = u\cdot v - \int v\,du.$$

пр. 1 $\int x\cos x\,dx = \begin{pmatrix} u=x \Rightarrow du=dx \\ dv=\cos x\,dx \Rightarrow v=\sin x \end{pmatrix} = x\sin x - \int \sin x\,dx =$

$= x\sin x + \cos x + C$

пр. 2 $\int x^2 \ln x\,dx = \begin{pmatrix} u=\ln x \Rightarrow du=\frac{1}{x}dx \\ dv=x^2dx \Rightarrow v=\frac{x^3}{3} \end{pmatrix} = \frac{x^3}{3}\ln x - \int \frac{x^3}{3}\cdot\frac{1}{x}\,dx =$

$= \frac{x^3}{3}\ln x - \frac{x^3}{9} + C$

пр 3 $\int x^2 e^x\,dx = \begin{pmatrix} u=x^2 \Rightarrow du=2x\,dx \\ dv=e^x dx \Rightarrow v=e^x \end{pmatrix} = \ldots = e^x(x^2-2x+2)+C$

пр 4 $\int \operatorname{arctg} x\,dx = \begin{pmatrix} u=\operatorname{arctg} x \Rightarrow du=\frac{dx}{1+x^2} \\ v=x \end{pmatrix} = x\operatorname{arctg} x - \int \frac{x\,dx}{1+x^2}$

$= \begin{pmatrix} 1+x^2=t \\ 2x\,dx=dt \end{pmatrix} = x\operatorname{arctg} x - \frac{1}{2}\int \frac{dt}{t} = x\operatorname{arctg} x - \frac{1}{2}\ln(1+x^2)+C$

пр 5 $\int \frac{\arcsin\sqrt{x}}{\sqrt{x}}\,dx = \begin{pmatrix} u=\arcsin\sqrt{x} \Rightarrow du=\frac{dx}{2\sqrt{x}\sqrt{1-x}} \\ dv=\frac{dx}{\sqrt{x}} \Rightarrow v=\int x^{-1/2}dx = 2\sqrt{x} \end{pmatrix} =$

$= 2\sqrt{x}\arcsin\sqrt{x} - \int \frac{dx}{\sqrt{1-x}} = (1-x=p \Rightarrow dx=-dp) = 2\left(\sqrt{x}\arcsin\sqrt{x} + \sqrt{1-x}\right)+C$

пр 6 $I = \int e^x\cos x\,dx = (\text{2 интегрирования по частям}) = e^x\sin x + e^x\cos x - I$

$2I = e^x(\sin x + \cos x) \Rightarrow I = \frac{e^x(\sin x+\cos x)}{2} + C$

пр 7 $\int \ln x\,dx = \begin{pmatrix} u=\ln x \Rightarrow du=\frac{1}{x}dx \\ v=x \end{pmatrix} = x\ln x - x + C$

пр 8 $\int x e^{2x}\,dx = \begin{pmatrix} u=x \Rightarrow du=dx \\ v=\int e^{2x}dx = \frac{1}{2}e^{2x} \end{pmatrix} = \ldots = \frac{1}{4}e^{2x}(2x-1)+C$

пр. 9 $\int x\ln(x-1)\,dx = \begin{pmatrix} u=\ln(x-1) \Rightarrow du=\frac{dx}{x-1} \\ v=\frac{1}{2}x^2 \end{pmatrix} = \frac{x^2}{2}\ln(x-1) - \frac{1}{2}\int \frac{x^2\,dx}{x-1}$

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

$= \ldots = \frac{1}{2}\ln(x-1)(x^2-1) - \frac{1}{4}x(x+2) + C$