Vypočítejte integrály metodou per partes:

1) $\int x\sin x\,dx = -x\cos x + \sin x + C$

2) $\int x^2 \ln x\,dx = \frac{x^3}{3}\left(\ln x - \frac{1}{3}\right) + C$

3) $\int x\cos 3x\,dx = \frac{1}{3}x\sin 3x + \frac{1}{9}\cos 3x + C$

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

5) $\int \ln(x+3)\,dx = (x+3)\cdot\ln(x+3) - x + C$

6) $\int x^2 \operatorname{arctg} x\,dx = \frac{1}{3}x^3\operatorname{arctg} x - \frac{1}{6}x^2 + \frac{1}{6}\ln\left(1+x^2\right) + C$

7) $\int \operatorname{arctg}\sqrt{x}\,dx = x\operatorname{arctg}\sqrt{x} - \sqrt{x} + \operatorname{arctg}\sqrt{x} + C = (x+1)\operatorname{arctg}\sqrt{x} + C$

8) $\int \frac{\ln^3 x}{x^2}\,dx = -\frac{1}{x}\left(\ln^3 x + 3\ln^2 x + 6\ln x + 6\right) + C$

9) $\int x\cdot \operatorname{tg}^2 x\,dx = x\operatorname{tg} x + \ln\left|\cos x\right| - \frac{x^2}{2} + C$

10) $\int (3x+2)\mathrm{e}^x\,dx = \mathrm{e}^x(3x-1) + C$

11) $\int x^2\mathrm{e}^{-x}\,dx = -x^2\mathrm{e}^{-x} - 2x\mathrm{e}^{-x} - 2\mathrm{e}^{-x} + C = \mathrm{e}^{-x}(-x^2 - 2x - 2) + C$

12) $\int (3x+1)\cos x\,dx = (3x+1)\sin x + 3\cos x + C$

13) $\int 2x\mathrm{e}^{3x}\,dx = \frac{2}{3}x\mathrm{e}^{3x} - \frac{2}{9}\mathrm{e}^{3x} + C = \frac{2}{9}\mathrm{e}^{3x}(3x-1) + C$

14) $\int \left(x^2+2\right)\ln x\,dx = \frac{x^3+6x}{3}\ln x - \frac{1}{9}x^3 - 2x + C$

15) $\int \operatorname{arctg}\frac{x-1}{x+1}\,dx = x\operatorname{arctg}\frac{x-1}{x+1} - \frac{1}{2}\ln\left(x^2+1\right) + C$

16) $\int \arcsin x\,dx = x\arcsin x + \sqrt{1-x^2} + C$

17) $\int (x+1)\cdot \ln\left(x^2+2\right)dx = \frac{1}{2}\left(x^2+2x+2\right)\ln\left(x^2+2\right) - \frac{1}{2}\left(x^2+4x\right) + \frac{4}{\sqrt{2}}\operatorname{arctg}\frac{x}{\sqrt{2}} + C$

18) $\int (x^2-3x+2)\mathrm{e}^x\,dx = \mathrm{e}^x(x^2-5x+7) + C$

19) $\int \operatorname{arctg}\sqrt{2x-1}\,dx = x\operatorname{arctg}\sqrt{2x-1} - \frac{\sqrt{2x-1}}{2} + C$

20) $\int \frac{x}{\sin^2 x}dx = -x\operatorname{cotg} x + \ln\left|\sin x\right| + C$