3.1 a) $\int_0^1 2x-1+\frac{3}{x^2+1}\,dx = \left[x^2-x+3\,\mathrm{arctg}\,x\right]_0^1 = \frac{3\pi}{4}$

b) $\int_0^{\ln 5} 3e^x+4\,dx = \left[3e^x+4x\right]_0^{\ln 5} = 12+4\ln 5$

c) $\int_a^b \frac{x-2}{b-a}\,dx = \left[\frac{\frac{x^2}{2}-2x}{b-a}\right]_a^b = \frac{b+a}{2}-2$

3.2 $f(-x) = \frac{(-x)^2\sin(-x)}{(-x)^4+5} = \frac{x^2(-\sin x)}{x^4+5} = -f(x)$ f je lichá fce $\Rightarrow \int_{-\pi}^{\pi}\frac{x^2\sin x}{x^4+5}\,dx = 0$

3.3 $\int_0^1 (2x+3)e^x\,dx = \left[(2x+3)\cdot e^x\right]_0^1 - \int_0^1 2e^x\,dx = (5e-3)-\left[2e^x\right]_0^1 = (5e-3)-(2e-2) = 3e-1$

3.4 $\int_0^1 (2x+4)\,\mathrm{arctg}\,x\,dx = \left[(x^2+4x)\cdot\mathrm{arctg}\,x\right]_0^1 - \int_0^1\frac{x^2+4x}{x^2+1}\,dx = \left(5\frac{\pi}{4}-0\right)-\left[x+2\ln(x^2+1)-\mathrm{arctg}\,x\right]$

$= \frac{5\pi}{4}-\left(1+2\ln 2-\frac{\pi}{4}\right) = \frac{3\pi}{2}-1-2\ln 2$

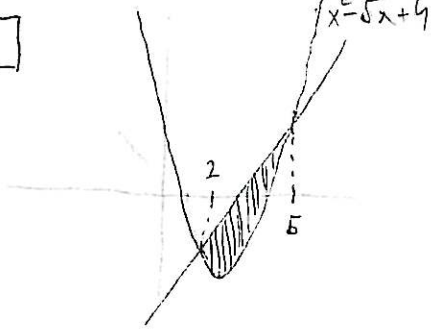
3.5 $\int_0^{\ln 7} e^x\cdot\sqrt{e^x+2}\,dx = \left|\begin{matrix}e^x+2=t\\ e^x dx=dt\end{matrix}\right| = \int_3^9\sqrt{t}\,dt = \left[\frac{t^{\frac32}}{\frac32}\right]_3^9 = \frac23 27-\frac23 3\sqrt3 = 18-2\sqrt3$

3.6 $\int_0^e \frac{2}{x(\ln^2 x+6\ln x+9)}\,dx = \int_0^1\frac{2}{(t+3)^2}\,dt = \left[-\frac{2}{t+3}\right]_0^1 = -\frac12-\left(-\frac23\right) = \frac16$

3.7 $\int\frac{2}{(x+3)^4}\,dx = \frac{2(x+3)^{-3}}{-3}+C$ $\int_0^{+\infty}\frac{2}{(x+3)^4}\,dx = \lim_{x\to+\infty}\frac{2}{-3(x+3)^3}-\lim_{x\to0^+}\frac{2}{-3(x+3)^3} = \frac{2}{81}$

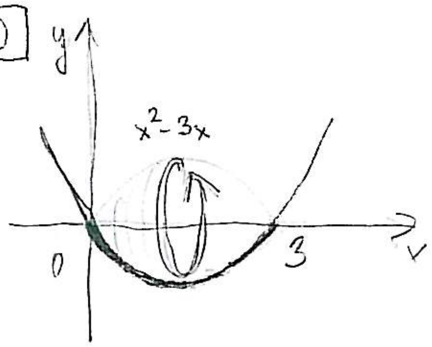
3.8 $\int_{-\frac{\pi}{2}}^{\frac{\pi}{2}}\cos x\,dx = \left[+\sin x\right]_{-\frac{\pi}{2}}^{\frac{\pi}{2}} = +1-(-1) = 2$

3.9



$S = \int_2^5 2x-6-(x^2-5x+4)\,dx = \left[\frac{7x^2}{2}-10x-\frac{x^3}{3}\right]_2^5 = \frac92$

3.10



$V = \pi\int_0^3(x^2-3x)^2\,dx = \pi\cdot\left[\frac{x^5}{5}-\frac{6x^4}{4}+3x^3\right]_0^3 = \frac{81}{10}\pi$