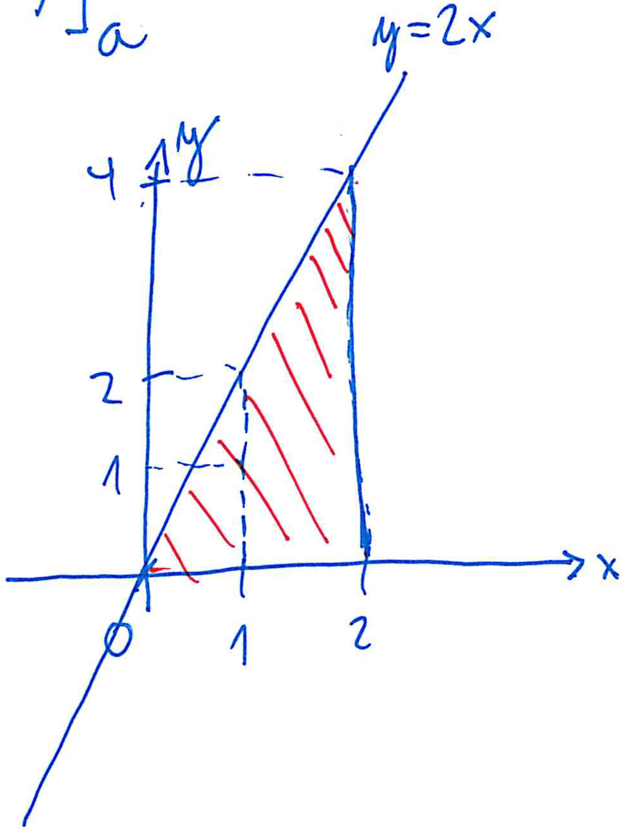
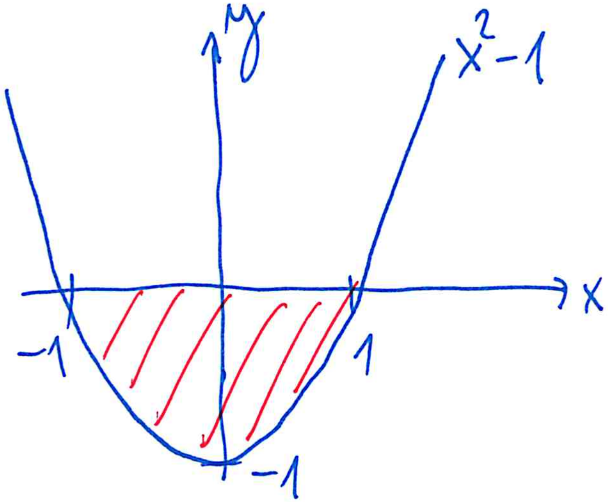
Výpočet určitého integrálu

$$\int_a^b f(x)\,dx = F(b) - F(a) = \left[F(x)\right]_a^b$$

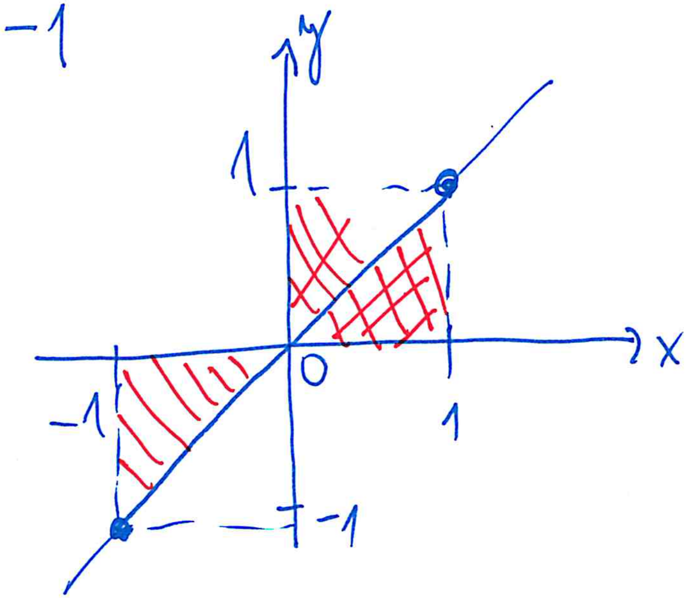
$$\int_0^2 2x\,dx = \left[x^2\right]_0^2 = 2^2 - 0^2 = 4$$



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



$$\int_{-1}^{1}x\,dx = \left[\frac{x^2}{2}\right]_{-1}^{1} = \frac{1}{2}-\frac{1}{2} = 0$$



$$\int_0^{\pi} x\cdot\sin x\,dx = \Big[-x\cos x\Big]_0^{\pi} + \int_0^{\pi}\cos x\,dx = \pi + \Big[\sin x\Big]_0^{\pi} = \underline{\underline{\pi}}$$

$u = x \quad u' = 1$

$v' = \sin x \quad v = -\cos x$

$$\int_0^1 x\cdot e^{x^2+1}\,dx = \frac{1}{2}\int_1^2 e^t\,dt = \frac{1}{2}\Big[e^t\Big]_1^2 = \underline{\underline{\frac{1}{2}(e^2-e)}}$$

$t = x^2+1$

$dt = 2x\,dx \;/:2$

$\frac{1}{2}\,dt = x\,dx$

$$\int_0^{\frac{\pi}{2}} \cos^3 x \, dx = \int_0^{\frac{\pi}{2}} \cos^2 x \cdot \cos x \, dx = \int_0^{\frac{\pi}{2}} (1-\sin^2 x) \cos x \, dx = \int_0^1 (1-t^2) \, dt =$$

$$\sin^2 x + \cos^2 x = 1$$

$$\cos^2 x = 1 - \sin^2 x$$

$$t = \sin x$$

$$dt = \cos x \, dx$$

$$= \left[t - \frac{t^3}{3} \right]_0^1 = \frac{2}{3}$$

$$\int_1^e \frac{\boxed{\ln x}}{x} dx = \int_0^1 r \, dr = \left[\frac{r^2}{2} \right]_0^1 = \frac{1}{2}$$

$$r = \boxed{\ln x}$$

$$dr = \frac{1}{x} dx$$