$$\int_0^5 (x^3 - x)\,dx = \left[\frac{x^4}{4} - \frac{x^2}{2}\right]_0^5 = \frac{5^4}{4} - \frac{5^2}{2} - \underbrace{\left(\frac{0^4}{4} - \frac{0^2}{2}\right)}_{0} = \underline{\frac{5^4}{4} - \frac{5^2}{2}}$$

$$\int_0^1 \sqrt{4-2x}\,dx = \left[\frac{(4-2x)^{\frac{3}{2}}}{\frac{3}{2}} \cdot \left(-\frac{1}{2}\right)\right]_0^1 = -\frac{1}{3}\left(\overset{\sqrt{8}}{2^{\frac{3}{2}}} - \overset{8}{4^{\frac{3}{2}}}\right) =$$

$$= \underline{\underline{\frac{1}{3}\left(8 - \sqrt{8}\right)}}$$

$$\int_0^{\frac{\pi}{2}} x^2 \cos 2x \, dx = \overbrace{\left[\frac{1}{2} x^2 \sin 2x\right]_0^{\frac{\pi}{2}}}^{=0} - \int_0^{\frac{\pi}{2}} x \sin 2x \, dx = -\left(-\frac{1}{2}\left[x \cos 2x\right]_0^{\frac{\pi}{2}} + \frac{1}{2}\int_0^{\frac{\pi}{2}} \cos 2x \, dx\right) =$$

$u = x^2 \qquad u' = 2x$

$v' = \cos 2x \qquad v = \frac{1}{2}\sin 2x$

$u = x \qquad u' = 1$

$v' = \sin 2x \qquad v = -\frac{1}{2} \cancel{\sin}\cos 2x$

$$= \frac{1}{2}\left(-1 \cdot \frac{\pi}{2} - 0\right) - \frac{1}{2}\frac{1}{2}\left[\sin 2x\right]_0^{\frac{\pi}{2}} = \underline{\underline{-\frac{\pi}{4}}}$$

$$\int_1^e x\ln x\,dx = \left[\frac{x^2}{2}\ln x\right]_1^e - \int_1^e \frac{x}{2}\,dx = \frac{e^2}{2} - 0 - \left[\frac{x^2}{4}\right]_1^e =$$

$u = \ln x \qquad u' = \frac{1}{x}$

$v' = x \qquad v = \frac{x^2}{2}$

$$= \frac{e^2}{2} - \left(\frac{e^2}{4} - \frac{1}{4}\right) = \frac{e^2}{4} + \frac{1}{4}$$

$$\int_1^2 x e^{(x^2-1)}\,dx = \frac{1}{2}\int_0^3 e^t\,dt = \frac{1}{2}\left[e^t\right]_0^3 = \frac{1}{2}\left(e^3 - 1\right)$$

$t = x^2 - 1$

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

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

$$\int_0^2 \frac{2x}{x^2+7}\,dx = \int_7^{11} \frac{ds}{s} = \Big[\ln s\Big]_7^{11} = \underline{\underline{\ln 11 - \ln 7}}$$

$$s = x^2 + 7$$

$$ds = 2x\,dx$$

$$\int_0^2 \frac{2x}{x^2+7}\,dx = \Big[\ln(x^2+7)\Big]_0^2 = \ln 11 - \ln 7$$

$$\int \frac{2x}{x^2+7}\,dx = \int \frac{ds}{s} = \ln s = \ln(x^2+7) + c$$

$$\int_0^1 \frac{3-2x}{x^2-5x+6}\,dx = \int_0^1 \frac{3-2x}{(x-2)(x-3)}\,dx = \int_0^1 \left(\frac{1}{x-2} - \frac{3}{x-3}\right)dx \overset{*}{=}$$

$$\cancel{\int} \frac{3-2x}{(x-2)(x-3)} = \frac{A}{x-2} + \frac{B}{x-3} = \frac{1}{x-2} - \frac{3}{x-3}$$

$A=1 \quad B=-3$

$$*) = \Big[\ln|x-2| - 3\ln|x-3|\Big]_0^1 = \ln 1 - 3\ln 2 - (\ln 2 - 3\ln 3) =$$

$$= \underline{3\ln 3 - 4\ln 2 + \ln 1}$$

$$x^2-5x+6 = \left(x-\frac{5}{2}\right)^2 - \frac{1}{4}$$

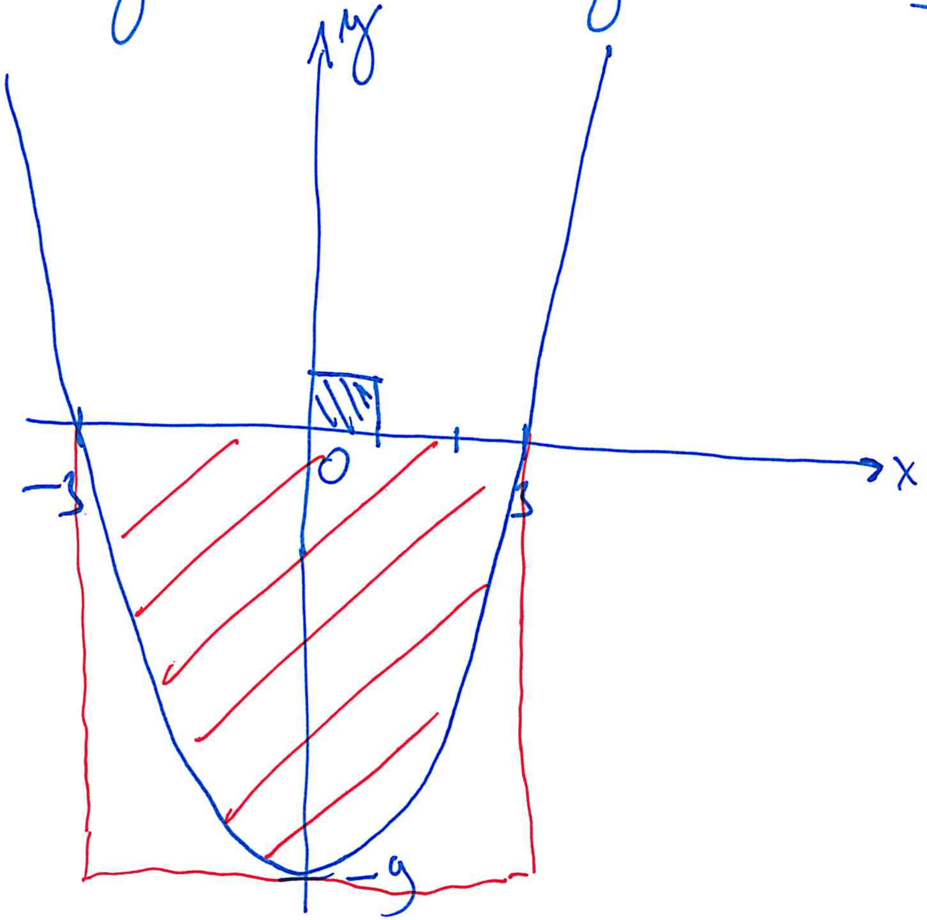
$$\int_{0}^{\pi} \sin^3 x \cdot \cos x \, dx = \int_{0}^{0} t^3 \, dt = \left[\frac{t^4}{4} \right]_{0}^{0} = 0$$

$$t = \sin x$$

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

Vypočítejte obsah:

$y = x^2 - 9$ a $y = 0$



$$S = -\int_{-3}^{3} (x^2 - 9)\,dx = -\left[\frac{x^3}{3} - 9x\right]_{-3}^{3} =$$

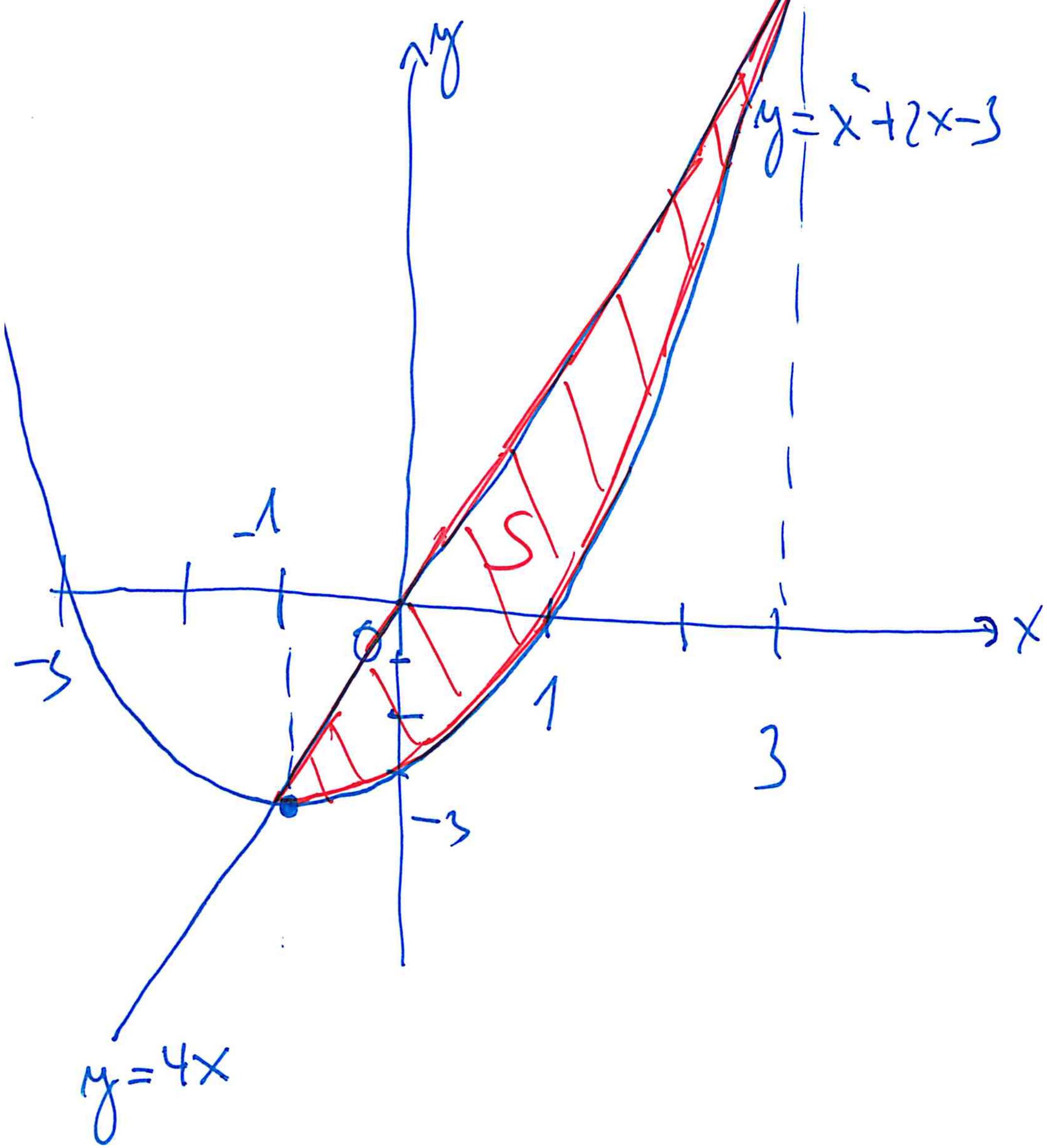
$$= -\left(9 - 27 - (-9 + 27)\right) =$$

$$= -(18 - 54) = \underline{\underline{36}}$$

$$\cancel{S = \dots\dots = -36 = 36}$$

Obsah mezi $y = x^2+2x-3$ a $y = 4x$

$y = (x+3)(x-1)$



prienik: $x^2+2x-3 = 4x$

$$x^2-2x-3=0$$

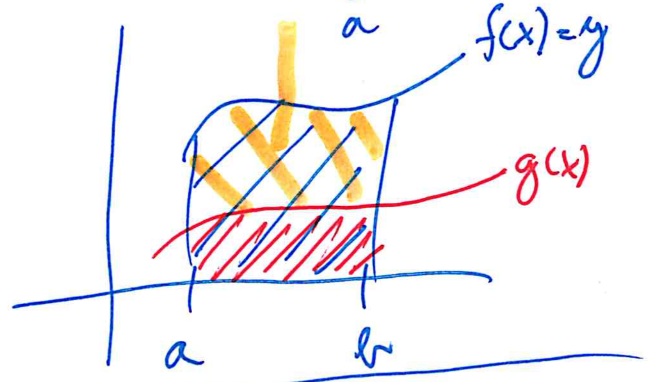
$$(x-3)(x+1)=0$$

$x=3$

$x=-1$

$$S = \int_a^b f(x)\,dx - \int_a^b g(x)\,dx$$

$$\int_a^b f(x)\,dx$$



$$\int_a^b g(x)\,dx$$

$$\boxed{S = \int_a^b [f(x)-g(x)]\,dx}$$

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

$$= \left[x^2 - \frac{x^3}{3} + 3x\right]_{-1}^{3} = \cancel{9} - \cancel{9} + 9 - \left(1 + \frac{1}{3} - 3\right) = 5 + \frac{1}{3} = \underline{\underline{\frac{16}{3}}}$$