

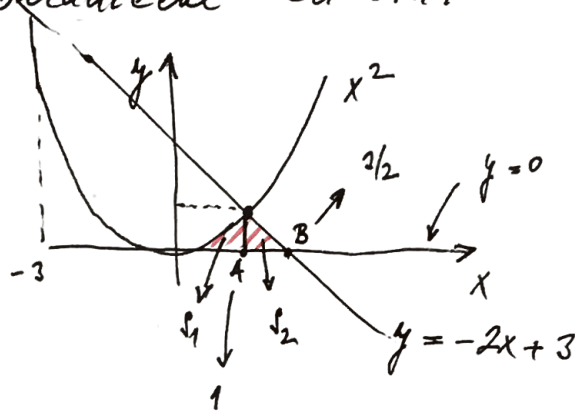
Aplikace určitého int. I. část

- Obvrah plochy

Pr-1

Obvrah plochy ohraničene' křivkami

$$\begin{aligned}y &= x^2 \\y &= -2x + 3 \\y &= 0\end{aligned}$$



$$S = S_1 + S_2$$

A = ?

$$y = x^2$$

$$y = -2x + 3$$

$$x^2 = -2x + 3$$

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

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

$$x_1 = 1, x_2 = -3$$

B = ?

$$y = -2x + 3$$

$$y = 0$$

$$-2x + 3 = 0$$

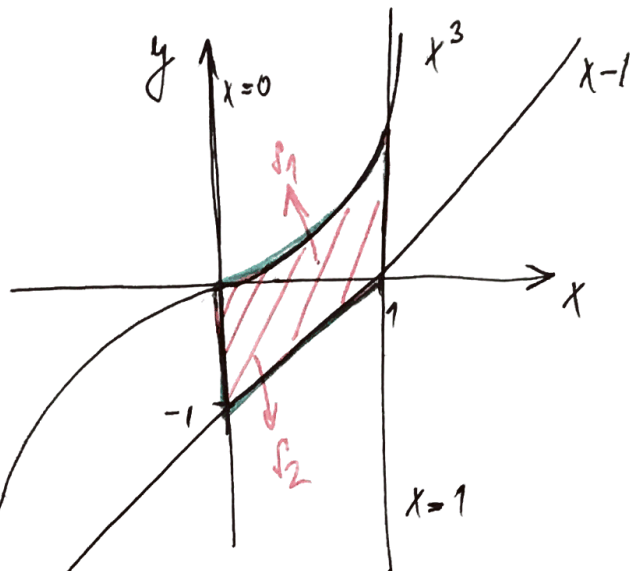
$$-2x = -3$$

$$x = \frac{3}{2}$$

$$\begin{aligned}S &= S_1 + S_2 = \int_0^1 x^2 dx + \int_1^{3/2} (-2x + 3) dx = \frac{1}{4} \\&= \left[\frac{x^3}{3} \right]_0^1 + \left[-\frac{2x^2}{2} + 3x \right]_1^{3/2} = \left(\frac{1}{3} - 0 \right) + \left(-\frac{9}{4} + \frac{9}{2} + 1 - 3 \right) = \\&= \frac{1}{3} + \frac{1}{4} = \frac{4+3}{12} = \frac{7}{12} j^2\end{aligned}$$

Pr 2

$$\begin{aligned} y &= x^3 & x &= 0 \\ y &= x-1 & x &= 1 \end{aligned}$$



1. zpusob

$$\begin{aligned} I &= S_1 + S_2 = \int_0^1 x^3 dx - \\ &\quad - \int_0^1 x-1 dx = \left[\frac{x^4}{4} \right]_0^1 - \left[\frac{x^2}{2} - x \right]_0^1 = \frac{1}{4} - \left(\frac{1}{2} - 1 \right) = \frac{1}{4} + \frac{1}{2} = \frac{3}{4} \end{aligned}$$

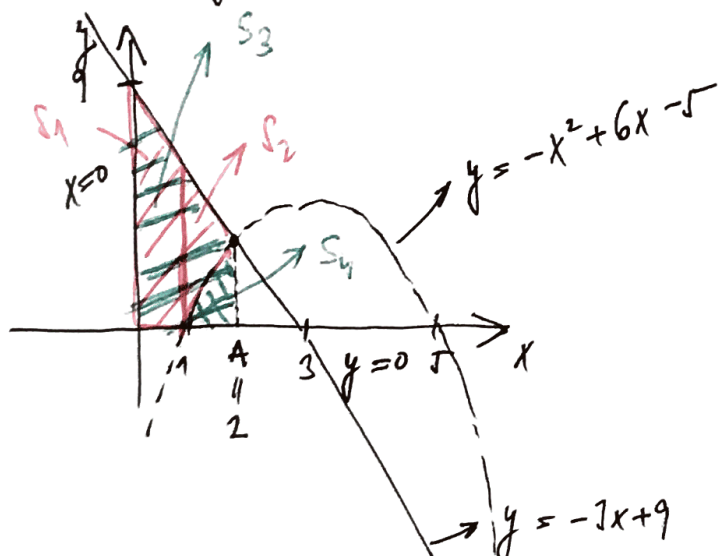
2. zpusob

$$I = \int_0^1 (x^3 - (x-1)) dx$$

Pr 3

$$\begin{aligned} y &= -x^2 + 6x - 5 \\ y &= -3x + 9 \end{aligned}$$

$$\begin{aligned} y &= 0 \rightarrow \text{max} \\ x &= 0 \rightarrow \text{max} \end{aligned}$$



$$\begin{aligned} y &= -x^2 + 6x - 5 = \\ &= -(x^2 - 6x + 5) = \\ &= -(x-5)(x-1) = 0 \\ x_1 &= 5 \quad x_2 = 1 \end{aligned}$$

$$\begin{aligned} y &= -3x + 9 \\ \text{pr. } S \text{ os. } y & \quad x=0 \\ y &= 0+9 \\ \text{pr. } S \text{ os. } x & \\ y &= -3x + 9 = 0 \\ x &= 3 \end{aligned}$$

1. zpusob

$$\begin{aligned} I &= S_1 + S_2 = \int_0^1 -3x+9 dx + \\ &+ \int_1^2 (-3x+9) - (-x^2+6x-5) dx \end{aligned}$$

2. zpusob

$$I = S_3 - S_4 = \int_0^2 -3x+9 dx - \int_1^2 (-x^2+6x-5) dx$$

$$\begin{aligned} A &= ? \\ y &= -x^2 + 6x - 5 \\ y &= -3x + 9 \end{aligned}$$

$$-x^2 + 6x - 5 = -3x + 9 \Rightarrow -x^2 + 9x - 14 = 0$$

$$\begin{aligned} &= -(x-7)(x-2) = 0 \\ &\Rightarrow -(x-7)(x-2) = 0 \\ &\Rightarrow -(x^2 - 9x + 14) = 0 \end{aligned}$$