

## 9. minitest - varianta A

Dvojný integrál

2. 5. 2024

Vypočítejte integrál

$$\iint_M (x+y) dx dy,$$

kde  $M$  je trojúhelník s vrcholy  $[0, 1]$ ,  $[1, 2]$  a  $[1, 3]$ .

$$\iint_M (x+y) dy dx = \int_0^1 \int_{x+1}^{2x+1} (x+y) dy dx$$

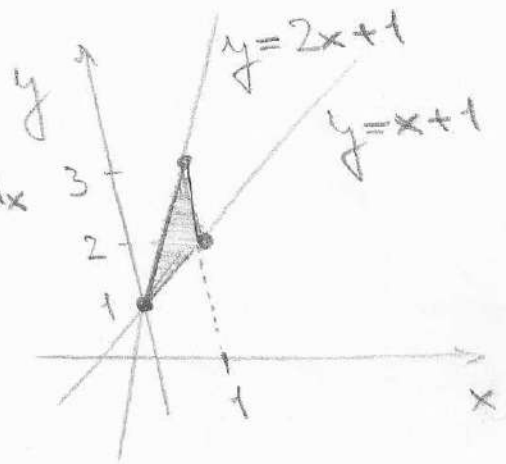
$$= \int_0^1 \left[ xy + \frac{y^2}{2} \right]_{x+1}^{2x+1} dx$$

$$= \int_0^1 \left( x \cdot (2x+1) + \frac{1}{2} (2x+1)^2 - x \cdot (x+1) - \frac{1}{2} (x+1)^2 \right) dx$$

$$= \int_0^1 \left( 2x^2 + x + \frac{1}{2} (4x^2 + 4x + 1) - x^2 - x - \frac{1}{2} (x^2 + 2x + 1) \right) dx$$

$$= \int_0^1 \left( \frac{5}{2} x^2 + x \right) dx = \left[ \frac{5}{2} \frac{x^3}{3} + \frac{x^2}{2} \right]_0^1 =$$

$$= \frac{5}{6} + \frac{1}{2} = \frac{8}{6} = \frac{4}{3}$$



### 9. minitest - varianta B

Limita posloupnosti

2. 5. 2024

Vypočítejte limitu posloupnosti

$$\lim_{n \rightarrow \infty} \left( \frac{2n+3}{2n-7} \right)^{5n}$$

$$\lim_{n \rightarrow \infty} \left( \frac{2n+3}{2n-7} \right)^{5n} = \lim_{n \rightarrow \infty} \left( 1 + \frac{10}{2n-7} \right)^{5n} =$$

$$= \left( \lim_{n \rightarrow \infty} \left( 1 + \frac{10}{2n-7} \right)^{2n-7+7} \right)^{\frac{5}{2}} =$$

$$= \left( \underbrace{\lim_{n \rightarrow \infty} \left( 1 + \frac{10}{2n-7} \right)^{2n-7}}_{e^{10}} \cdot \underbrace{\lim_{n \rightarrow \infty} \left( 1 + \frac{10}{2n-7} \right)^7}_{=1} \right)^{\frac{5}{2}}$$

$$= \left( e^{10} \cdot 1 \right)^{\frac{5}{2}} = e^{10 \cdot \frac{5}{2}} = \underline{\underline{e^{25}}}$$