

## OBSEG PREPROGE SIERPINSKEGA

Osnovni element preproge Sierpinskega je kvadrat, za katerega vemo, da se obseg izračuna kot  $O = 4 \times a$ . Osnovni kvadrat  $S_0$  ima osnovnico z dolžino 1.



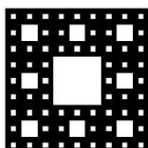
$$O_0 = 4 \times 1 = 4$$



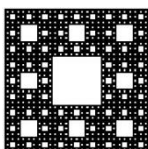
$$O_1 = 4 + 4 \times \frac{1}{3} = 4 + \frac{4}{3} = \frac{16}{3}$$



$$O_2 = 4 + \frac{4}{3} + 8 \times 4 \times \frac{1}{9} = \frac{80}{9}$$



$$O_3 = 4 + \frac{4}{3} + \frac{32}{9} + 8 \times 8 \times 4 \times \frac{1}{27} = \frac{496}{27}$$



$$O_n = 4 + \frac{4}{3} + \frac{32}{9} + \frac{256}{27} + \dots + 8^{n-1} \times \frac{4}{3^n}$$

Splošno formulo  $O_n$  se preoblikuje.

$$\begin{aligned} O_n &= 4 + \frac{4}{3} + \frac{32}{9} + \frac{256}{27} + \dots + \frac{4}{3} \times \left(\frac{8}{3}\right)^{n-1} = \\ &= 4 + \sum_{n=1}^{\infty} \frac{4}{3} \times \left(\frac{8}{3}\right)^{n-1} = \\ &= 4 + \frac{4}{3} \times \sum_{n=1}^{\infty} \left(\frac{8}{3}\right)^{n-1} \end{aligned}$$

TUKAJ MORAM DOKAZATI DA  $O_n$  VELJA. SEVEDA S POPOLNO INDUKCIJO. ZAČELA SEM TAKO:  
PREDPOSTAVIMO DA VELJA  $O_{n-1}$  IN DOKAŽIMO DA VELJA  $O_n$ .

$$O_n = O_{n-1} + \frac{4}{3} \times \left(\frac{8}{3}\right)^{n-1}$$

$$O_n = 4 + \frac{4}{3} \times \sum_{n=2}^{\infty} \left(\frac{8}{3}\right)^{n-2} + \frac{4}{3} \times \left(\frac{8}{3}\right)^{n-1}$$

DVOMIM DA JE RDEČA VRSTICA PRAV

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$$O_n = 4 + \frac{4}{3} \times \sum_{n=1}^{\infty} \left(\frac{8}{3}\right)^{n-1}$$

DOBITI PA MORAM TO VRSTICO. KAJ PRIDE VMES, KJER SO ..... (PIKICE)????