$$\sum_{n=2}^{\infty} \frac{t^n}{n-1} = t\sum_{n=2}^{\infty} \frac{t^{n-1}}{n-1} = t \sum_{n=2}^{\infty} \int_0^t s^{n-2}\, ds = t \cdot \int_0^t \boxed{\sum_{n=2}^{\infty} s^{n-2}}\, ds = t \cdot \int_0^t \underbrace{\sum_{n=0}^{\infty} s^n}_{\frac{1}{1-s}}\, ds$$

$$\int t^n = \frac{t^{n+1}}{n+1} \qquad \frac{1}{1-x} = \sum_{n=0}^{\infty} x^n$$

$$= t \cdot \int_0^t \frac{1}{1-s}\, ds = t \cdot \int_1^{1-t} \frac{1}{a}(-da) = -t \cdot \int_1^{1-t} \frac{da}{a} = -t \cdot \ln|a| \Big|_1^{1-t} = -t \cdot (\ln|1-t| - \overset{0}{\ln 1})$$

$a = 1-s$

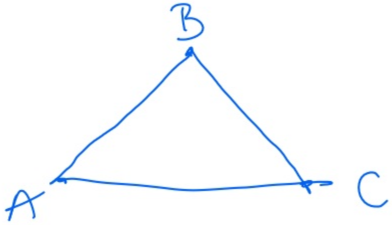
$da = -ds$

$s = 0 \quad a = 1-0 = 1$

$s = t \quad a = 1-t$

$$= -t \cdot \ln|1-t|$$

$$\int_L 2x\,dl \qquad A(5,-5) \quad B(-5,-5) \quad C(5,5)$$



$$\int_L 2x\,dl = \int_{AB} 2x\,dl + \int_{BC} 2x\,dl + \int_{CA} 2x\,dl$$

$\underline{\underline{AB}}$ $\quad A(x_A, y_A)$

$B(x_B, y_B)$

$$\boxed{y - y_A = \frac{y_B - y_A}{x_B - x_A}(x - x_A)}$$

$A(5,-5)$

$B(-5,-5)$

$y = -5 \qquad y_t = 0$

$x = t \qquad x_t = 1$

$t \in [-5, 5]$

$$\int_{AB} 2x\,dl = \int_{-5}^{5} 2\cdot t\cdot \underbrace{\sqrt{1}}_{\sqrt{x_t^2 + y_t^2}}\,dt = \int_{-5}^{5} 2t\,dt = \frac{2t^2}{2}\Big|_{-5}^{5} = t^2\Big|_{-5}^{5}$$

$$= 25 - 25 = \underline{\underline{0}}$$

$\underline{\underline{BC}}$ $B(-5,-5)$

$C(5,5)$

$x=y$

$x=t \quad x_t=1$

$y=t \quad y_t=1$

$t\in[-5,5]$

$$\int_{BC} 2x\,dl = \int_{-5}^{5} 2\cdot t\cdot\sqrt{2}\,dt = \cancel{2}\sqrt{2}\,\frac{t^2}{\cancel{2}}\Big|_{-5}^{5} = \sqrt{2}\,(25-25) = \underline{\underline{0}}$$

$\underline{\underline{CA}}$ $C(5,5)$

$A(5,-5)$

$x=5 \quad x_t=0$

$y=t \quad y_t=1$

$t\in[5,5]$

$$\int_{CA} 2x\,dl = \int_{-5}^{5} 2\cdot 5\sqrt{1}\,dt = 10\int_{-5}^{5} dt = 10\,t\Big|_{-5}^{5} = 10\cdot(5+5) = \underline{\underline{100}}$$

$$\int_{L} 2x\,dl = \int_{AB} 2x\,dl + \int_{BC} 2x\,dl + \int_{CA} 2x\,dl = 0+0+100 = \underline{\underline{100}}$$

$$\sum_{n=0}^{\infty} \frac{2^n 3^n \cdot (n+1)}{n!\,(2n+3)}$$

$$\lim_{n\to\infty}\left|\frac{a_{n+1}}{a_n}\right| = \lim_{n\to\infty} \frac{\dfrac{2^{\cancel{n+1}}\, 3^{\cancel{n+1}} \cdot (n+2)}{(n+1)\cancel{!}\,(2(n+1)+3)}}{\dfrac{\cancel{2^n} \cdot \cancel{3^n}\,(n+1)}{\cancel{n!}\,(2n+3)}} = \lim_{n\to\infty} \frac{\dfrac{2\cdot 3(n+2)}{(n+1)(2n+5)}}{\dfrac{n+1}{2n+3}} = \lim_{n\to\infty} \frac{\overbrace{6(n+2)(2n+3)}^{2.\ \text{степен}}}{\underbrace{(n+1)^2(2n+5)}_{3.\ \text{степен}}}$$

$$(n+1)! = (n+1)\cdot n!$$

$$= 0 < 1 \quad \checkmark$$

На основу Даламберовог крит. ред конвергира.

$$\sum_{n=1}^{\infty} \frac{n^5+67^8+1000000n}{200n^3+10000000}$$

$$\lim_{n\to\infty} \frac{n^5+67^8+100000n}{200n^3+1\ldots\ldots} = \infty \neq 0$$

← горе је већи степен

На основу крит. о див. ред дивергира

$$x^2+y^2-10 \le z \le 100-x^2-y^2$$

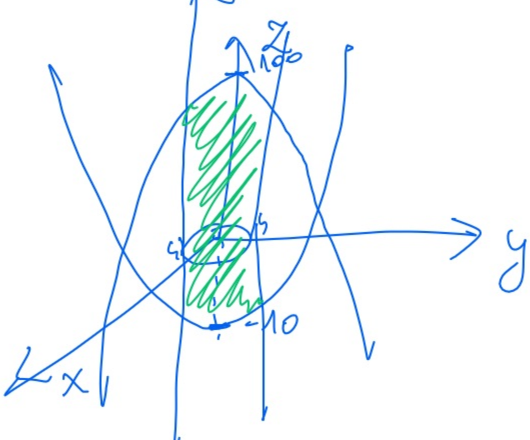
$$x^2+y^2 \le 16$$

Пресек

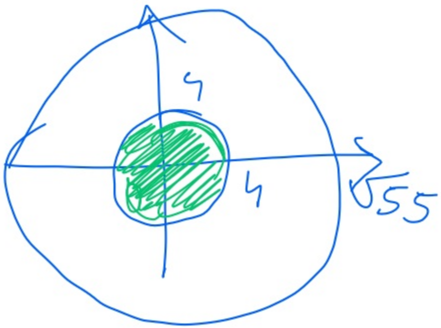
$$x^2+y^2-10 = 100-x^2-y^2$$

$$2x^2+2y^2 = 110 \quad /:2$$

$$x^2+y^2 = 55$$



Пројекција



$x = r\cos\varphi$

$y = r\sin\varphi$

$r \in [0,4]$

$\varphi \in [0,2\pi]$

$$V = \iint_D \left(100-x^2-y^2-(x^2+y^2-10)\right)dx\,dy$$

$$= \int_0^{2\pi} d\varphi \int_0^4 \left(100-r^2-(r^2-10)\right)\cdot r\,dr$$

$$= \int_0^{2\pi} d\varphi \int_0^4 (110-2r^2)\,r\,dr$$

$$= \int_0^{2\pi} d\varphi \int_0^4 (110r-2r^3)\,dr$$

$$= \int_0^{2\pi} \left(55r^2-\frac{r^4}{2}\right)\Big|_0^4 d\varphi$$

$$= \int_0^{2\pi} \left(55\cdot 16-\frac{1}{2}\cdot 256\right)d\varphi = \int_0^{2\pi}(880-128)\,d\varphi$$

$$= 752\varphi\Big|_0^{2\pi} = \boxed{1504\pi}$$

$$\sum n^2 t^n = t \sum n \cdot (n t^{n-1})$$

$$(c \cdot f(x))' = c \cdot f'(x)$$

$$(c + f(x))' = 0 + f'(x) \neq c + f'(x)$$