Molnár Zoltán Gábor IB36WO	1	2	3	4
	C	D	B	C

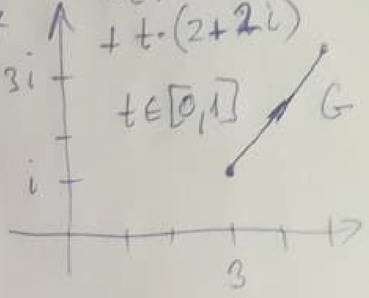
① $\sqrt[n]{\left|\frac{(2i)^n}{n^4+3n^2+7}\right|} = \sqrt[n]{\frac{2^n}{n^4+3n^2+7}} = \frac{2}{\sqrt[n]{n^4+3n^2+7}} =$

$= \longrightarrow \frac{2}{1} = 2 \Rightarrow R = \frac{1}{2}$

② $\dot{z}(t) = 2+2i$; $\left(\overline{z(t)}\right)^7 = (3+2t-i-2i\cdot t)^7$

$z(t) = 3+i+t\cdot(2+2i)$

$t \in [0,1]$



$$I = \int_0^1 (3+2t-i-2i\cdot t)^7 \cdot (2+2i)\, dt =$$

$$= (2+2i)\cdot\left[\frac{(3+2t-i-2i\cdot t)^8}{8}\cdot\frac{1}{2-2i}\right]_0^1 =$$

$$= \frac{2+2i}{2-2i}\cdot\frac{1}{8}\left((5-2i)^8 - (3-i)^8\right)$$

③ $\partial_y P = 3y^2$; $\partial_x Q = -3y^2$

$$\frac{\partial_y P - \partial_x Q}{Q} = \frac{6y^2}{-3xy^2} = -2\frac{1}{x}$$

$$\mu = e^{-2\int \frac{1}{x}dx} = e^{-2\ln x} = \frac{1}{x^2}$$

$x + \frac{y^3}{x^2} - 3\frac{1}{x}y^2\cdot y' = 0$ egzakt

$\partial_x F = x + \frac{y^3}{x^2} \rightarrow F = \frac{x^2}{2} - \frac{y^3}{x} + C(y)$

$\partial_y F = -3\frac{1}{x}y^2 \Rightarrow C'(y) = 0 \Rightarrow C(y) = c$

$$\boxed{\frac{x^2}{2} - \frac{y^3}{x} = \text{konst}}$$

④ $y_H = C_1 e^x + C_2 e^{4x}$; e^x rezonál $\boxed{xe^x}$-rel.

$\Rightarrow y_{IHP} = x(Ax+B)e^x$

$y' = Ae^x x^2 + 2Ae^x x + Be^x x + Be^x$

$y'' = Ae^x x^2 + 4Ae^x x + 2Ae^x + Be^x x + 2Be^x$

Behelyettesítve az egyenletbe:

$2Ae^x - 6Ae^x x - 3Be^x = xe^x$

$\Rightarrow A = -\frac{1}{6}$; $B = \frac{0-2A}{-3} =$

$= -\frac{1}{9} \Rightarrow$

$y_{IHÁlt} = C_1 e^x + C_2 e^{4x} +$

$-\frac{1}{6}x^2 e^x + \left(-\frac{1}{9}\right)e^x\cdot x$