$z = x + iy$

$r = |z| = \sqrt{x^2 + y^2}$

$\theta = \tan^{-1} \dfrac{y}{x}$

$z = |z| \angle \theta \longrightarrow z = re^{i\theta}$

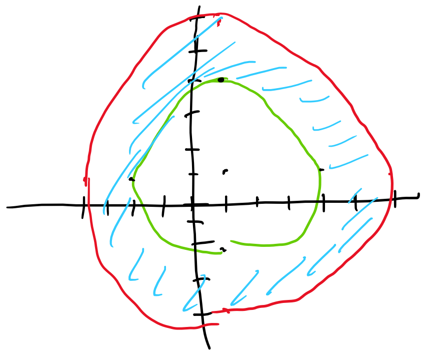
$z_1 = r_1 e^{i\theta_1} \qquad z_2 = r_2 e^{i\theta_2}$

$z_1 + z_2 = r_1 e^{i\theta} + r_2 e^{i\theta_2}$

$z_1 z_2 = r_1 r_2 e^{i(\theta_1 + \theta_2)}$

$\overset{r_1}{3} \leq |z - 1 - i| < \overset{r_2}{5}$

$|z - \boxed{(1+i)}| \rightarrow$ TP



$f(z) \rightarrow$ PCR $\rightarrow$ harmonik $\rightarrow$ differentiable

$f(z) = u + iv$

$u_x = v_y$

$u_y = -v_x$

Pers. Laplace

$$\frac{\partial^2 u}{\partial x^2} + \frac{\partial^2 v}{\partial y^2} = 0$$

$$f(x+iy) = (x^2 - y^2 + 5) + i(2xy)$$

* cek PCR : $u_x = 2x \Rightarrow v_y = 2y$

$u_y = -2y = v_x = 2y$

* Turunan : $f'(x+iy) = 2x + i2y$

$f'(x+iy) = 2(x+iy)$

$f'(z) = 2z$

$f(z) = \int 2z \, dz$

$f(z) = z^2 + C$

* $f(x+iy) = (x+iy)^2 + c$

$= \cancel{x^2} - \cancel{y^2} + \cancel{2ixy} + c = (\cancel{x^2} - \cancel{y^2} + 5) + \cancel{i(2xy)}$

$c = 5$

* $f(z) = z^2 + c = z^2 + 5$

$u(x,y) = xy \qquad v(x,y)$

* PCR : $u_x = y \Rightarrow v_y = \dfrac{\partial v}{\partial y}$

$u_y = x \Rightarrow -v_x = \dfrac{\partial v}{\partial x}$

$u_x = v_y$

$y = \dfrac{\partial v}{\partial y} \rightarrow v = \int y \, dy$

c

$v = \frac{1}{2}y^2 + g(x)$

$u_y = -v_x$

$x = \frac{\partial}{\partial x} - \left(\boxed{\frac{1}{2} y^2 + g(x)} \right)$ v

$x = -g'(x)$

$g(x) = \int -x \, dx$

$g(x) = -\frac{1}{2} x^2 + C$

$v = \frac{1}{2} y^2 + g(x)$

$v = \frac{1}{2} y^2 - \frac{1}{2} x^2 + C$

$z = x + iy \quad ; \quad \bar{z} = x - iy \qquad z = u + iv$

$z + \bar{z} = 2x + i.0 \qquad u_x = v_y$

$z - \bar{z} = i(2y) + 0 \qquad u_x = v_y$

$\int (2z + 5) \, dz$ dari $(0,0)$ ke $(4,2)$

$\frac{x - 0}{4 - 0} = \frac{y - 0}{2 - 0}$

$\frac{x}{\cancel{4}_2} = \frac{y}{\cancel{2}_1}$

$2y = x$

$y = t$

$x = 2t$

$f(z) = (2z + 5)$

$f(x+iy) = 2(x+iy) + 5$

$f(x+iy) = 2x + 5 + i2y$

$f(t) = 2(2t) + 5 + i(2t)$

$f(t) = 4t + 5 + 2it$

$\int_0^2 (4t + 5 + 2it) \, dt = 2t^2 + 5t + it^2 \Big|_0^2$

$= 8 + 10 + 4i = 18 + 4i$