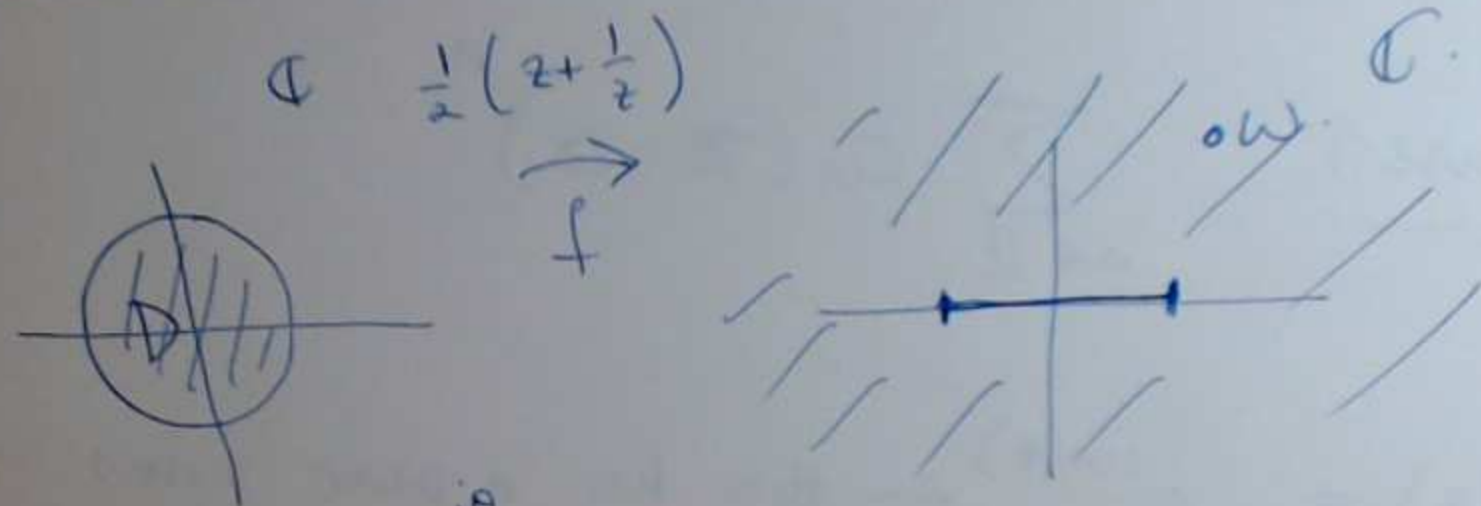


②



$$e^{i\theta} \mapsto \frac{1}{2}(e^{i\theta} + e^{-i\theta}) = \cos \theta$$

$$f(\mathbb{D}) = \mathbb{C} \setminus [-1, 1]$$

$$f(z) = w$$

$$\frac{1}{2}\left(z + \frac{1}{z}\right) = w$$

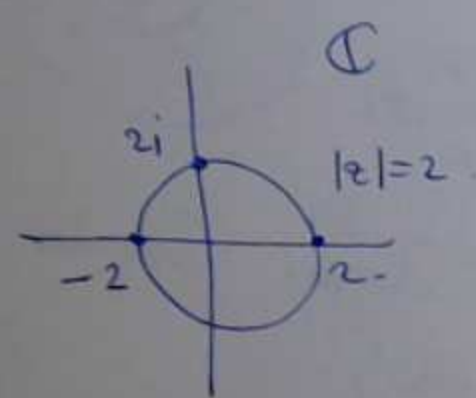
$$z + \frac{1}{z} = 2w$$

$$z^2 - 2wz + 1 = 0$$

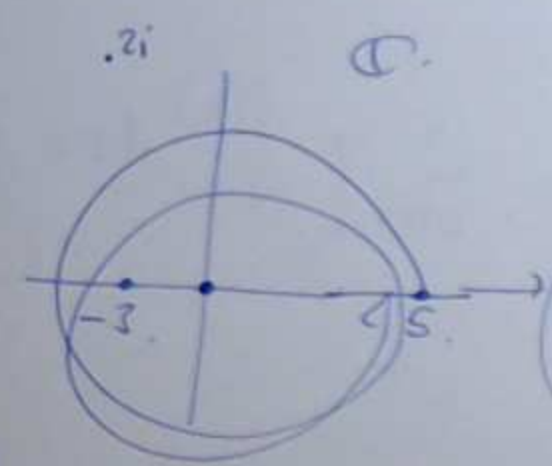
$$\frac{1}{z} = \frac{2w \pm \sqrt{4w^2 - 4}}{2}$$

$$z = 1 \pm \sqrt{4w^2 - 1}$$

c) $f(z) = \sqrt{z^2 + 2z - 3}$



$z \mapsto z^2 + 2z - 3$
 $(z+1)^2 - 4$
 $(z-1)(z+3)$



$z \mapsto \sqrt{z}$



change in arg
0

$$\sum_{n=1}^{\infty} \frac{z^n}{n}$$

$$f(z) = z + \frac{z^2}{2} + \frac{z^3}{3} + \dots$$

differentiate

$$f'(z) = 1 + z + z^2 + \dots = \frac{1}{1-z}$$

$$f(z) = \int \frac{1}{1-z} dz = -\ln(1-z)$$

$$\frac{1}{(1-z)^2}$$

$$\frac{1}{1-z} = 1 + z + z^2 + \dots$$

diff

$$\frac{1}{(1-z)^2}$$

$$= 1 + 2z + 3z^2 + 4z^3 + \dots$$

$$\frac{z}{(1-z)^3}$$

$$= z + 3 \cdot 2z^2 + 4 \cdot 3z^3 + \dots$$

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