

## Zadanie 2.

i)  $D: f(D), g^{-1}(D)$

$$D = \{ z \in \mathbb{C} : 0 \leq \text{Arg } z \leq \frac{\pi}{4} \}$$

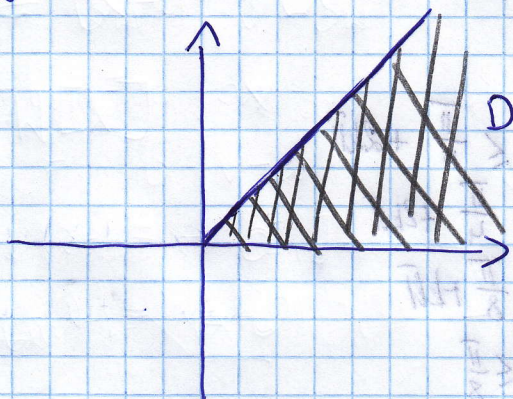
$$f(z) = iz^3 + 2i$$

$$g(z) = (z+1)^2$$

a)

$$0 \leq \text{Arg } z \leq \frac{\pi}{4}$$

$$\text{Arg } z \leq \frac{\pi}{4}$$



b)  $f(z) = f_1(f_2(f_3(z)))$

$$f_3(z) = z^3$$

$$f_2(z) = iz^3$$

$$f_1(z) = z + 2i$$

- $f_3(D) = \{ z \in \mathbb{C} : 0 \leq \text{Arg } z \leq \frac{3\pi}{4} \}$  gdzie  $\text{Arg } z^3 = 3 \text{Arg } z$

- $i = \cos \frac{\pi}{2} + i \sin \frac{\pi}{2}$

$$f_2(z) = iz = i(\cos \varphi + i \sin \varphi) = (\cos \frac{\pi}{2} + i \sin \frac{\pi}{2})(\cos \varphi + i \sin \varphi) = \cos(\varphi + \frac{\pi}{2}) + i \sin(\varphi + \frac{\pi}{2})$$

$$f_2(f_3(D)) = \{ z \in \mathbb{C} : 0 + \frac{\pi}{2} \leq \text{Arg } z \leq \frac{5\pi}{4} \}$$

- $f_1(z) = z + 2i$  — oznacza przesunięcie wykresu  $0 + 2i$

