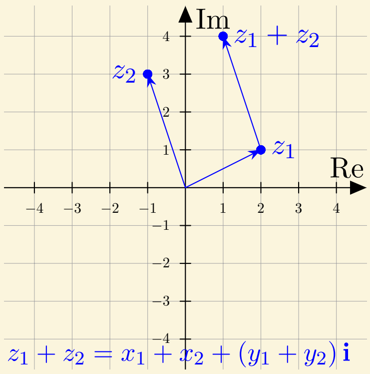
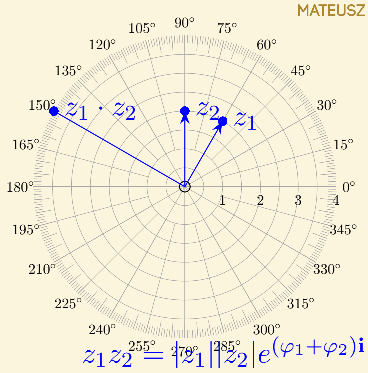
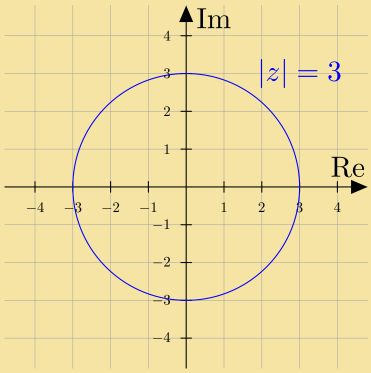
$\mathbf{i}^0$ $\quad \mathbf{i}^1 = \mathbf{i}$ $\quad \mathbf{i}^2 = -1$ $\quad \mathbf{i}^3 = -\mathbf{i}$ $\quad \mathbf{i}^4 = 1$ $\quad \mathbf{i}^5 = \mathbf{i}$ $\quad \ldots$ $\quad \mathbf{i}^{4n+k} = \mathbf{i}^k$

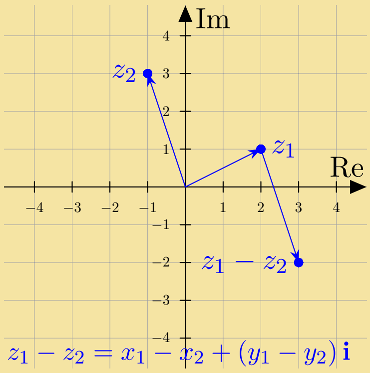
$$z = x + y\mathbf{i}$$
$$z = |z|\left(\cos\varphi + \mathbf{i}\sin\varphi\right)$$
$$z = |z|e^{\mathbf{i}\varphi}$$

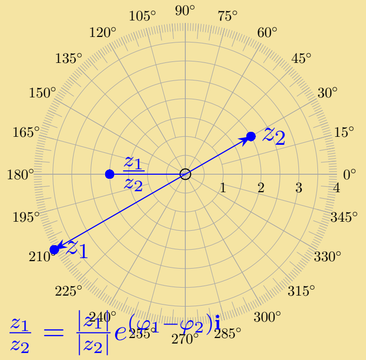
$$z_1 + z_2 = x_1 + x_2 + (y_1 + y_2)\,\mathbf{i}$$
$$z_1 - z_2 = x_1 - x_2 + (y_1 - y_2)\,\mathbf{i}$$
$$z_1 z_2 = |z_1||z_2|e^{(\varphi_1+\varphi_2)\mathbf{i}}$$
$$\frac{z_1}{z_2} = \frac{|z_1|}{|z_2|}e^{(\varphi_1-\varphi_2)\mathbf{i}}$$

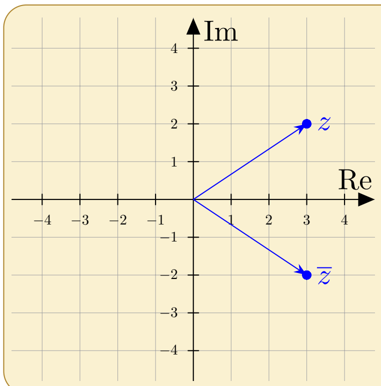


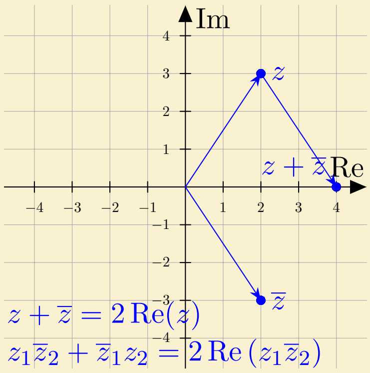


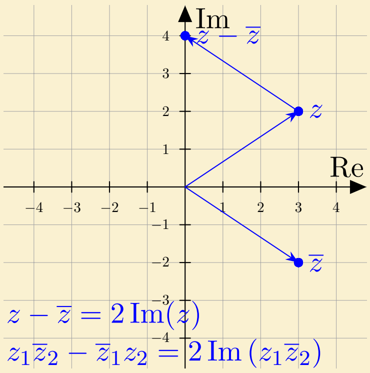








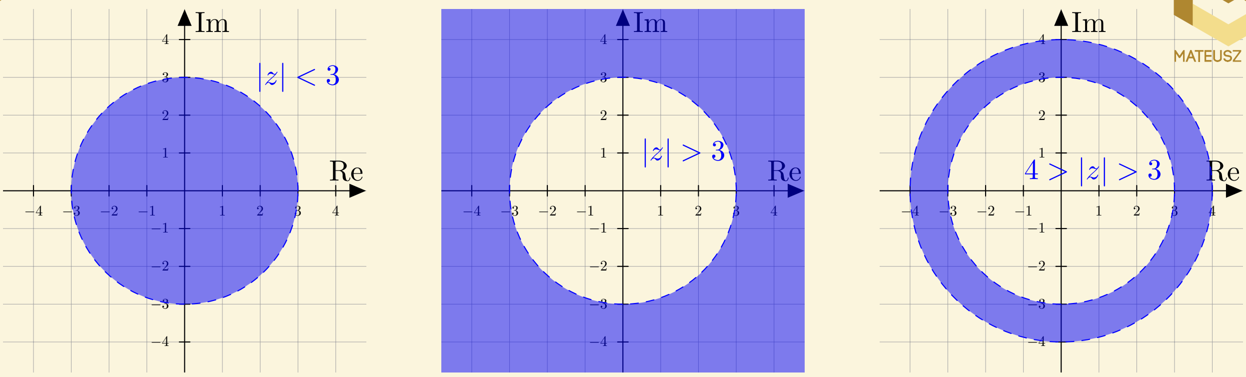


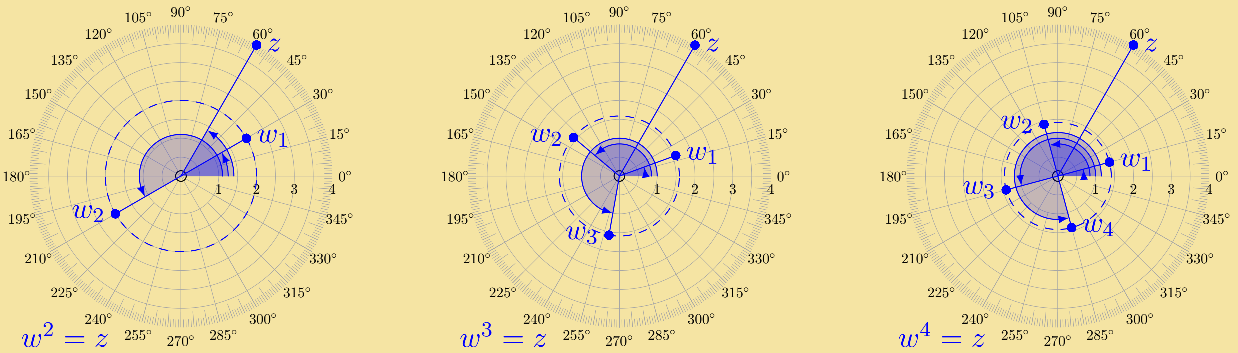


$$\overline{z_1 + z_2} = \overline{z}_1 + \overline{z}_2$$
$$\overline{z_1 - z_2} = \overline{z}_1 - \overline{z}_2$$
$$\overline{z_1 \cdot z_2} = \overline{z}_1 \cdot \overline{z}_2$$
$$\overline{\left(\frac{z_1}{z_2}\right)} = \frac{\overline{z}_1}{\overline{z}_2}$$
$$\overline{\overline{z}} = z$$

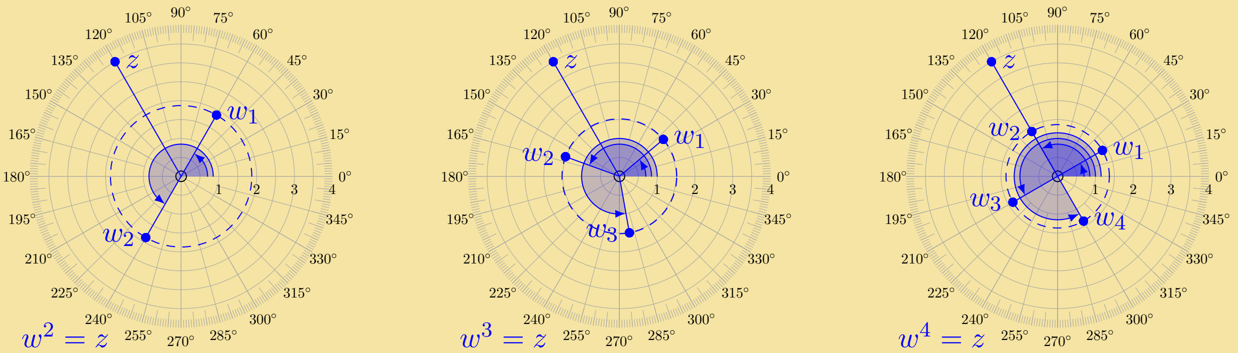
$$|z_1 \cdot z_2| = |z_1| \cdot |z_2|$$
$$\left|\frac{z_1}{z_2}\right| = \frac{|z_1|}{|z_2|}$$
$$|z|^n = |z^n|$$
$$|z| = |\overline{z}| = |-z| = |\mathbf{i}z|$$

$$\big||z_1| - |z_2|\big| \leqslant |z_1 + z_2|$$
$$\big||z_1| - |z_2|\big| \leqslant |z_1 - z_2|$$
$$|z_1 + z_2| \leqslant |z_1| + |z_2|$$
$$|z_1 - z_2| \leqslant |z_1| + |z_2|$$





$$w_{k+1} = \sqrt[n]{|z|}\left(\cos\frac{\varphi+2k\pi}{n} + \mathbf{i}\sin\frac{\varphi+2k\pi}{n}\right) \qquad k \in \{0, 1, \ldots, n-1\}$$



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

$$\varphi = \begin{cases} \operatorname{arctg}\frac{y}{x} & \text{dla } x > 0 \land y \geqslant 0 \\ \operatorname{arctg}\frac{y}{x} + 2\pi & \text{dla } x > 0 \land y < 0 \\ \operatorname{arctg}\frac{y}{x} + \pi & \text{dla } x < 0 \\ \frac{\pi}{2} & \text{dla } x = 0 \land y > 0 \\ \frac{3\pi}{2} & \text{dla } x = 0 \land y < 0 \\ \text{nieokreślone} & \text{dla } x = 0 \land y = 0 \end{cases}$$

$$\varphi = \begin{cases} \arccos\frac{x}{|z|} & \text{dla } y \geqslant 0 \land |z| \neq 0 \\ 2\pi - \arccos\frac{x}{|z|} & \text{dla } y < 0 \\ \text{nieokreślone} & \text{dla } |z| = 0 \end{cases}$$

$\varphi \in (-\pi, \pi]$

$$\varphi = \begin{cases} \operatorname{arctg}\frac{y}{x} & , x > 0 \\ \operatorname{arctg}\frac{y}{x} + \pi & , x < 0 \land y \geqslant 0 \\ \operatorname{arctg}\frac{y}{x} - \pi & , x < 0 \land y < 0 \\ \frac{\pi}{2} & , x = 0 \land y > 0 \\ -\frac{\pi}{2} & , x = 0 \land y < 0 \\ \text{nieokreślone} & , x = 0 \land y = 0 \end{cases}$$

$$\varphi = \begin{cases} \arccos\frac{x}{|z|} & \text{dla } y \geqslant 0 \land |z| \neq 0 \\ -\arccos\frac{x}{|z|} & \text{dla } y < 0 \\ \text{nieokreślone} & \text{dla } |z| = 0 \end{cases}$$