FKKT/Matematika DN1

1.1

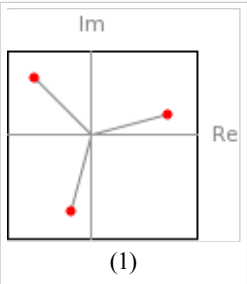
- $(2+3i)(4+3i) = (8+6i+12i+9i^2) = (8+18i-9) = (-1+18i)$
- $(4+3i)^{-1}(2+2i) = \frac{(2+2i)}{(4+3i)} \cdot \frac{(4-3i)}{(4-3i)} = \frac{8-6i+8i-6i^2}{4^2+3^2} = \frac{14}{25} + \frac{2i}{25}$
- $(2+2i)\overline{(3+3i)} = (2+2i)(3-3i) = 6-6i+6i-6i^2 = 6+6 = 12$
- $(1+i)^6 = \left(\sqrt{1^2+1^2}\ e^{i \arctan \frac{1}{1}}\right)^6 = \left(\sqrt{2}\right)^6\ e^{i6\arctan(1)} = 8\, e^{i\frac{3\pi}{2}} = 8{\cdot}0+8{\cdot}-1i = -8i$

1.2

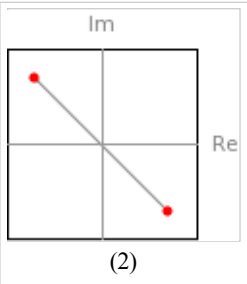
- $z_1 = 1+i = \sqrt{2}e^{i \arctan 1} = \sqrt{2}e^{i\frac{\pi}{4}}$
- $z_2 = -i = \sqrt{0^2+(-1)^2}\ e^{i \arctan \frac{-1}{0}} = e^{-i\frac{\pi}{2}}$
- $z_3 = 1+\sqrt{3}i = \sqrt{1+3}\ e^{i \arctan \frac{\sqrt{3}}{1}} = 2\ e^{i\frac{\pi}{3}}$
- $z_4 = 5 = \sqrt{25}\ e^{i \arctan \frac{0}{5}} = 5\ e^{i\cdot 0} = 5$

1.3

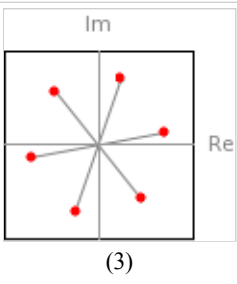
- $z^3 = 1+i$
  - $z = \sqrt{2}^{\frac{1}{3}}\ e^{i\frac{\arctan 1}{3}+\frac{2\pi}{3}k} = \sqrt[6]{2}\ e^{i\frac{\pi}{12}+\frac{2\pi}{3}k}; k = 0,1,2$
- $z^2 = -i$
  - $z = \sqrt{1}^{\frac{1}{2}}\ e^{i\frac{\arctan \frac{-1}{0}}{2}+\frac{2\pi}{2}k} = e^{i\frac{-\pi}{4}+\pi k}; k = 0,1$
- $z^6 = 1+\sqrt{3}i$
  - $z = \sqrt[6]{2}\ e^{i\frac{\arctan \sqrt{3}}{6}+\frac{2\pi}{6}k} = \sqrt[6]{2}\ e^{i\frac{\pi}{18}+\frac{\pi}{3}k}; k = 0,1,2,...,5$
- $z^5 = 5z$
  - $z^4 = 5$
  - $z = \sqrt[4]{5}\ e^{i\frac{\arctan \frac{0}{1}}{4}+\frac{2\pi}{4}k} = \sqrt[4]{5}\ e^{\frac{\pi}{2}k}; k = 0,1,2,3$



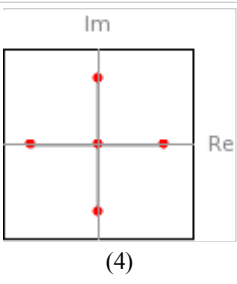
(1)



(2)



(3)



(4)
