DEPARTAMENTO
DE COMPUTACION
Facultad de Ciencias Exactas y Naturales - UBA

Práctica 6

2do cuatrimestre 2021 Álgebra I

Integrante	LU	Correo electrónico
Yago Pajariño	546/21	`ypajarino@dc.uba.ar`

Facultad de Ciencias Exactas y Naturales
Universidad de Buenos Aires
Ciudad Universitaria - (Pabellón I/Planta Baja)
Intendente Güiraldes 2610 - C1428EGA
Ciudad Autónoma de Buenos Aires - Rep. Argentina
Tel/Fax: (++54 +11) 4576-3300
http://www.exactas.uba.ar

Índice

6. Práctica 6

6.1. Ejercicio 1

6.1.A. Pregunta i

Paso a polares:

- $5i = 5(\cos(\frac{\pi}{2}) + i\sin(\frac{\pi}{2}))$
- $(1+i)^4 = (\sqrt{2})^4.(\cos(\pi) + i\sin(\pi))$

Luego,

$$\begin{aligned} z &= 4.5(\cos(\pi + \frac{\pi}{2}) + i\sin(\pi + \frac{\pi}{2})) \\ &= 20(\cos(\frac{3\pi}{2}) + i\sin(\frac{3\pi}{2})) \end{aligned}$$

Así,

- $Re(z) = 20.\cos(\frac{3\pi}{2}) = 0$
- $Im(z) = 20.\sin(\frac{3\pi}{2}) = -20$
- $|z| = 20$
- $Re(z^{-1}) = 0$
- $iz = 20(\cos(2\pi) + i\sin(2\pi)) \implies Im(iz) = 0$

6.1.B. Pregunta ii

$$\begin{aligned} z &= (\sqrt{2} + \sqrt{3}i)^2.(\overline{1-3i}) \\ &= (2 + 2\cdot\sqrt{2}\cdot\sqrt{3}i - 3).(1+3i) \\ &= (-1 + 2\cdot\sqrt{6}i).(1+3i) \\ &= -1 - 3i + 2\cdot\sqrt{6}i - 6\cdot\sqrt{6} \\ &= -1 - 6\cdot\sqrt{6} + (2\cdot\sqrt{6} - 3)i \end{aligned}$$

- $Re(z) = -1 - 6\cdot\sqrt{6}$
- $Im(z) = 2\cdot\sqrt{6} - 3$
- $|z| = \sqrt{(-1 - 6\cdot\sqrt{6})^2 + (2\cdot\sqrt{6} - 3)^2} = \sqrt{250} = 5\cdot\sqrt{10}$

6.1.C. Pregunta iii

Paso a polares,
$i^{17} = \cos(17.\frac{\pi}{2}) + i\sin(17\frac{\pi}{2})$
$\frac{1}{2} = \frac{1}{2}.(\cos(0) + i\sin(0))$
$i = \cos(\frac{\pi}{2}) + i\sin(\frac{\pi}{2})$
$(1-i)^3 = (\sqrt{2})^3(\cos(3.\frac{7}{4}\pi) + i\sin(3.\frac{7}{4}\pi))$

Luego,

$$\begin{aligned}\frac{1}{2}.i.(1+i)^3 &= \frac{1}{2}.(\sqrt{2})^3.\left(\cos(\frac{\pi}{2}+\frac{21}{4}\pi)+i\sin(\frac{\pi}{2}+\frac{21}{4}\pi)\right)\\ &= \frac{\sqrt{2}^3}{2}.\left(\cos\left(\frac{23}{4}\pi\right)+i\sin\left(\frac{23}{4}\pi\right)\right)\end{aligned}$$

Entonces,

$$\begin{aligned}z &= \frac{\sqrt{2}^3}{2}.\left(\cos\left((\frac{17}{2}+\frac{23}{4})\pi\right)+i\sin\left((\frac{17}{2}+\frac{23}{4})\pi\right)\right)\\ &= \frac{\sqrt{2}^3}{2}.\left(\cos\left(\frac{57}{4}\pi\right)+i\sin\left(\frac{57}{4}\pi\right)\right)\end{aligned}$$

- $Re(z) = \frac{\sqrt{2}^3}{2}.\cos\left(\frac{57}{4}\pi\right)$
- $Im(z) = \frac{\sqrt{2}^3}{2}.\sin\left(\frac{57}{4}\pi\right)$
- $|z| = \frac{\sqrt{2}^3}{2}$
- $Re(z^{-1}) = \cos\left(\frac{57}{4}\pi\right)$
- $Im(iz) = \frac{\sqrt{2}^3}{2}.\sin\left(\frac{59}{4}\pi\right)$

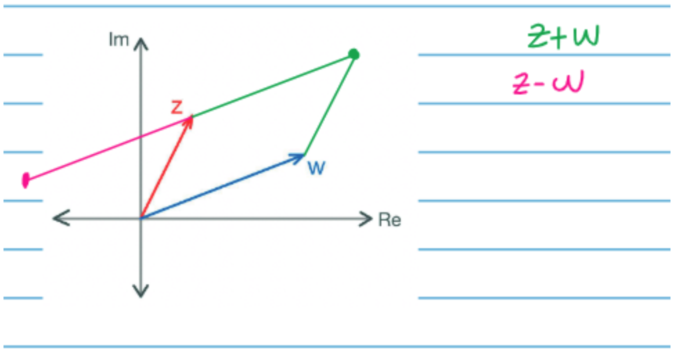
6.1.D. Pregunta iv

TODO

6.1.E. Pregunta v

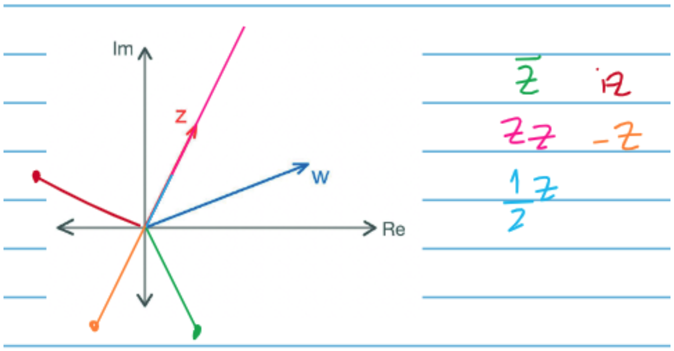
TODO

6.2. Ejercicio 2



1.

2.



3.