Álgebra Linear e Geometria Analítica

Exemplos

1. Conjunto dos Complexos

Sejam $z_1 = -1 - 4i$ e $z_2 = 2 + i$.

1) Determine na forma algébrica:

a) $Re(z_2)$

$$= Re(2+i) = 2$$

b) $\overline{z_2}$

$$= \overline{(2+i)} = 2 - i$$

c) $z_1 + z_2 =$

$$(-1 - 4i) + (2 + i) = -1 + 2 - 4i + i = 1 - 3i$$

d) $z_1 - z_2 =$

$$(-1 - 4i) - (2 + i) = -1 - 4i - 2 - i = -3 - 5i$$

e) $z_1 - 3z_2 =$

$$(-1 - 4i) - 3(2 + i) = -1 - 4i - 6 - 3i = -7 - 7i$$

f) $i^{22} =$

$$= i^{4\times 5+2} = i^2 = -1$$

g) $i^{17} =$

$$= i^{4\times 4+1} = i^1 = i$$

h) $z_1 . z_2$

$$= (-1-4i).(2+i) = -2 - i - 8i - 4i^2 = -2 - i - 8i - 4 \times (-1) = -2 - i - 8i + 4$$
$$= 2 - 9i$$

i) $\frac{z_1}{z_2}$

$$= \frac{(-1-4i)}{(2+i)} = \frac{(-1-4i)(2-i)}{(2+i)(2-i)} = \frac{-2+i-8i+4i^2}{2^2-i^2} = \frac{-2+i-8i-4}{4-(-1)} = \frac{-6-7i}{5}$$
$$= -\frac{6}{5} - \frac{7}{5}i$$

j) $o\ inverso\ de\ z_2$

$$(z_2)^{-1} = \frac{1}{z_2} = \frac{1 \times (2-i)}{(2+i)(2-i)} = \frac{2-i}{2^2-i^2} = \frac{2-i}{4-(-1)} = \frac{2-i}{5} = \frac{2}{5} - \frac{i}{5}$$

2) Calcule $|z_1|$ e $|z_2|$.

$z_1 = -1 - 4i$ e $z_2 = 2 + i$

$|z| = \left\|\overrightarrow{OP}\right\| = \sqrt{a^2 + b^2}$ é o **módulo** de z.

$$|z_1| = \sqrt{a^2 + b^2} = \sqrt{(-1)^2 + (-4)^2} = \sqrt{1 + 16} = \sqrt{17}$$

$$|z_2| = \sqrt{a^2 + b^2} = \sqrt{2^2 + 1^2} = \sqrt{4 + 1} = \sqrt{5}$$