

$$f(-2i) = 0 \quad -1$$

$$\begin{aligned} Z &= (z+2i)[z^2 + (-7+i)z + 14-2i] \quad -2 \\ &= z^3 + (-7+i)z^2 + (14-2i)z + 2iz^2 + 2i(-7+i)z + 2i(14-2i) \\ &= z^3 + (-7+i+2i)z^2 + (14-2i-14i-2)z + 28i+4 \\ &= z^3 + (-7+3i)z^2 + (14-16i)z + 28i+4 \\ &= f(z) \end{aligned}$$

-1 -أ) عددان حقيقيان a و b

$$(a+ib)^2 = -8-6i \Leftrightarrow \begin{cases} a^2 - b^2 = -8 \\ a^2 + b^2 = 10 \\ ab < 0 \end{cases}$$

$$\Leftrightarrow \begin{cases} a^2 = 1 \\ ab < 0 \end{cases} \text{ و } b^2 = 9$$

$$\Leftrightarrow \begin{cases} a=1 \text{ و } b=-3 \\ \text{أو} \\ a=-1 \text{ و } b=3 \end{cases}$$

الجذران المربعان للعدد $-8-6i$ هما $-1+3i$ و $1-3i$

ب-) لنحل المعادلة

$$z^2 + (-7+i)z + 14-2i = 0$$

$$\Delta = (-7+i)^2 - 4(14-2i)$$

$$= -8-6i$$

$$= (1-3i)^2$$

$$z = \frac{7-i+1-3i}{2} \text{ أو } z = \frac{7-i-1+3i}{2}$$

$$z = 3+i \text{ أو } z = 4-2i$$

$$z_2 = 3+i \text{ و } z_1 = 4-2i \text{ نضع}$$

$$f(z) = 0 \Leftrightarrow \begin{cases} z-2i = 0 \\ z^2 + (-7+i)z + 14-2i = 0 \end{cases}$$

$$\Leftrightarrow (z = z_0 = 2i \text{ أو } z = z_1 \text{ أو } z = z_2)$$

$$S = \{z_0, z_1, z_2\}$$

$$AC = |z_2 - z_0| = |3+3i| = 3\sqrt{2} \quad (-ج)$$

$$(\overrightarrow{AB}, \overrightarrow{AC}) \equiv \arg \frac{z_2 - z_0}{z_1 - z_0} \quad [2\pi]$$

$$\equiv \arg(z_2 - z_0) - \arg(z_1 - z_0) \quad [2\pi]$$

$$z_2 - z_0 = 3(1+i) = 3\sqrt{2} \left(\frac{\sqrt{2}}{2} + i \frac{\sqrt{2}}{2} \right) \text{ لدينا}$$

$$\begin{aligned} &= \left[3\sqrt{2}, \frac{\pi}{4} \right] \\ z_2 - z_0 &= [4, 0] \\ (\overline{AB}, \overline{AC}) &\equiv \frac{\pi}{4} \quad [2\pi] \quad \text{إذن} \end{aligned}$$

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