6. **a) Siendo** $z = 1 - 3i$ y $w = \sqrt{8}_{45^\circ}$**, calcular:** $z + w, z \cdot w, 2z, \dfrac{z^3}{w}$

b) Calcula: $\dfrac{i^{35} - i^5}{2i^{10}}$

7. a) Opera: $\dfrac{(1-2i)(-2+i)}{3i(1-i)}$

b) Resuelve la siguiente ecuación y expresa el resultado en forma binómica:

$$\frac{3 - zi + 2i}{2} = z + i$$

8. **Siendo** $z = 4\sqrt{3} - 4i$**, se pide:**

a) z^5

b) Las raíces cúbicas de z

9. **Halla el valor de x para que el cociente (1 + 3xi) : (3 –4i)**
   a) **Sea un número imaginario puro.**
   b) **Sea un número real.**
   c) **Tenga módulo 1**

10. Encontrar a y b para que $\dfrac{a - 6i}{3 + bi} = \sqrt{2}_{315}$

NÚMEROS COMPLEJOS

⑥ a) $z = 1-3i$, $W = \sqrt{8}_{45^\circ} = 2+2i$

$\downarrow$

$z = \sqrt{10}_{288'4^\circ}$

$z+w = (1-3i) + (2+2i) = 3-i$

$z \cdot w = (1-3i) \cdot (2+2i) = 8-4i$

$2z = 2-6i$

$$\frac{z^3}{w} = \frac{(1-3i)^3}{2+2i} = \frac{-26+18i}{2+2i} = -2+11i$$

b) $$\frac{i^{35} - i^5}{2 \cdot i^{10}} = \frac{(-i) - i}{2 \cdot (-1)} = \frac{-2i}{-2} = i$$

$35 \underline{|4}$; $3 \quad 8$ — $5 \underline{|4}$; $1 \quad 1$ — $10 \underline{|4}$; $2 \quad 2$

	R
$i^1 = i$	1
$i^2 = -1$	2
$i^3 = -i$	3
$i^4 = 1$	0

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⑦ a) $$\frac{(1-2i)(-2+i)}{3i(1-i)} = \frac{5i}{3+3i} = \frac{5}{6} + \frac{5}{6}i$$

b) $$\frac{3-zi+2i}{2} = z+i \rightarrow 3-zi+2i = 2z+2i \rightarrow 3 = 2z+zi$$

$$3 = (2+i)z \rightarrow z = \frac{3}{2+i} \cdot \frac{2-i}{2-i} = \frac{6-3i}{5} = \frac{6}{5} - \frac{3}{5}i$$

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⑧ $z = 4\sqrt{3} - 4i = 8_{330^\circ}$

a) $z^5 = (8_{330})^5 = 8^5{}_{330 \cdot 5} = 32768_{1650^\circ} = 32768_{210^\circ}$

b) $$\sqrt[3]{z} = \sqrt[3]{8_{330^\circ}} = \sqrt[3]{8}_{\frac{330+k360}{3}} = 2 \begin{cases} 110^\circ \\ 230^\circ \\ 350^\circ \end{cases}$$

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(9) $\frac{1+3xi}{3-4i}\cdot\frac{3+4i}{3+4i}=\frac{(3-12x)+(9x+4)i}{25}$

a) $\frac{3-12x}{25}=0 \qquad x=\frac{1}{4}$

b) $\frac{9x+4}{25}=0 \qquad x=\frac{-4}{9}$

c) $\sqrt{\left(\frac{3-12x}{25}\right)^2+\left(\frac{9x+4}{25}\right)^2}=1 \rightarrow x=\pm\sqrt{\frac{8}{3}}$

(10) $\frac{a-6i}{3+bi}=\sqrt{2}_{315}$

$\frac{a-6i}{3+bi}\cdot\frac{3-bi}{3-bi}=\frac{3a-18i-abi+6bi^2}{9+b^2}=\frac{(3a-6b)}{9+b^2}+\frac{(-18-ab)i}{9+b^2}$

$\sqrt{2}_{315°}=\sqrt{2}\cos 315+\sqrt{2}\operatorname{sen}315i=\sqrt{2}\cdot\frac{\sqrt{2}}{2}-\sqrt{2}\cdot\frac{\sqrt{2}}{2}i=1-i$

$\Rightarrow \left.\begin{array}{l}\frac{3a-6b}{9+b^2}=1\\ \frac{-18-ab}{9+b^2}=-1\end{array}\right\}\left.\begin{array}{l}3a-6b=9+b^2\\ -18-ab=-9-b^2\end{array}\right\}\begin{array}{l}a=\frac{9+b^2+6b}{3}\\ -18-\left(\frac{9+b^2+6b}{3}\right)b=-9-b^2\end{array}$

$54+9b+b^3+6b^2=-27-3b^2 \rightarrow b^3+9b^2+9b+81=0$

$$\begin{array}{r|rrrr} & 1 & 9 & 9 & 81\\ -9 & & -9 & 0 & -81\\ \hline & 1 & 0 & 9 & 0\end{array}$$

$$\boxed{\begin{array}{l}b=-9\rightarrow a=12\\ b=3i\rightarrow a=6i\\ b=-3i\rightarrow a=-6i\end{array}}$$

$x^2+9=0$

$x^2=-9$

$x=\pm\sqrt{-9}=\pm3i$