1. Find the real value of x and y if $\frac{(1+i)\,x-2i}{3+i}+\frac{(2-3i)\,y+i}{3-i}=i$

2. Find the square root : $-7-24\,i$

3. Evaluate the following : $x^4+4x^3+6x^2+4x+9$, when $x=-1+i\sqrt{2}$

4. If $1,\omega,\omega^2$ be cube roots of unity and n is a positive integer, then $1+\omega^n+\omega^{2n}=\begin{cases}3, \text{ when n is a multiple of 3}\\ 0, \text{ when n is not a multiple of 3}\end{cases}$

5. Solve the equation $(x-1)^3+8=0$ in the set C of all complex numbers.

6. Find the common roots of the equations : $z^3+2z^2+2z+1=0$ and $z^{1985}+z^{100}+1=0$.

7. Prove that $\left(\frac{i+\sqrt{3}}{-i+\sqrt{3}}\right)^{200}+\left(\frac{i-\sqrt{3}}{i+\sqrt{3}}\right)^{200}=-1.$

8. Express the complex number in the polar form : $\frac{2+6\sqrt{3}\,i}{5+\sqrt{3}\,i}$

9. Express in A + iB form : $\left(\frac{1}{1-2i}+\frac{3}{1+i}\right)\left(\frac{3+4i}{2-4i}\right)$

10. Show that $(a+bw+cw^2)^3+(a+bw^2+cw)^3=(2a-b-c)(2b-c-a)(2c-a-b)$ and =27 abc, if a + b + c = 0

11. If $2x=(3+5i)$, Find the value of $2x^3+2x^2-7x+72$ and show that is will be unaltered if $2x=(3-5i)$

12. Simplify : (i) $\frac{3}{(1+i)}-\frac{2}{(2-i)}+\frac{2}{(1-i)}$ (ii) $\left(\frac{1+i}{1-i}\right)^{4n+1}$

13. Find the smallest +ve integer n for which $\left(\frac{1+i}{1-i}\right)^n=1$.

14. If $x=a+b$, $y=aw+bw^2$, $z=aw^2+bw$. Prove that $x^3+y^3+z^3=3(a^3+b^3)$.

15. If $1, w, w^2$ are cube roots of unity, prove that $(1-w+w^2)(1-w^2+w^4)(1-w^4+w^8)+\ldots$ to 2n terms $=4^n$.

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