

BAL BHARATI PUBLIC SCHOOL
Ganga Ram Hospital Marg, New Delhi-60

CLASS -XI
ASSIGNMENT- 4

SUBJECT – MATHEMATICS
TOPIC– COMPLEX NUMBERS

Q1. Find the real values of x and y, if

- (i) $(x + y)(2 - 3i) = 4 + i$
- (ii) $\frac{(1+i)x - 2i}{3+i} + \frac{(2-3i)y + i}{3-i} = i$
- (iii) $(x - iy)(3 + 5i)$ is the conjugate of $6 + 24i$.

Q2. Find the modulus and arguments of each of the following and represent it in the argand plane (i) $z = -1 - i\sqrt{3}$ (ii) $z = -\sqrt{3}$

$$+ i \quad (\text{iii}) \quad 1 - i \quad (\text{iv}) \quad \frac{1+2i}{1-2i}$$

Q3. Express the following complex numbers in polar form :-s

$$(\text{i}) \sin 50^0 + i \cos 50^0 \qquad (\text{ii}) \quad \text{Cos} 70^0 + i \text{ Cos} 20^0$$

Q4. Solve each of the following equations:-

$$\begin{array}{lll} (\text{i}) \sqrt{3}x^2 - \sqrt{2}x + 2\sqrt{3} = 0 & (\text{iv}) & x^2 - \sqrt{2}xi + 12 = 0 \\ (\text{ii}) \quad x^2 + \frac{x}{\sqrt{2}} + 1 = 0 & & (\text{v}) \quad 3x^2 - 7xi + 6 = 0 \\ (\text{iii}) \quad 3x^2 - 4x + \frac{20}{3} = 0 & & \end{array}$$

Q5. Find the conjugate the following;-

$$(\text{i}) \quad \frac{1}{3+4i} \qquad (\text{ii}) \quad 7+5i \qquad (\text{iii}) \quad \frac{1}{(2-5i)^2} \qquad (\text{iv}) \quad \frac{(3-2i)(2+3i)}{(1+2i)(2-i)}$$

Q6. Find the multiplicative inverse of the following complex number:-

$$(\text{i}) \quad (2 + \sqrt{3}i)^2 \qquad (\text{ii}) \quad \frac{5 + \sqrt{2}i}{5 - \sqrt{2}i}$$

Q7. Express the following complex number in form $a + ib$

$$\begin{array}{lll} (\text{i}) \quad \left(\frac{1}{3} + 3i \right)^3 & (\text{ii}) \quad (1-i)^4 & (\text{iii}) \quad \frac{6+3i}{2-i} \\ (\text{iv}) \quad \left(\frac{1}{3} + \frac{7}{3}i \right) + \left(4 + \frac{1}{3}i \right) - \left(\frac{-4}{3} + i \right) & & (\text{iv}) \quad i^{26} + i^5 \end{array}$$

Q8. If $z = x + iy$ and $w = \frac{1 - iz}{z - i}$, show that $|w| = 1 \Rightarrow z$ purely real.

Q9. Convert the complex number $z = \frac{i - 1}{\cos \frac{\pi}{3} + i \sin \frac{\pi}{3}}$ in the polar form

Q10. Show that the images of the complex numbers $3 + 2i$, $5i$, $-3 + 2i$ and $-i$ form a square.

Q11. For a complex number z , what is the value of $\text{Arg } z + \text{Arg } \bar{z}$ ($z \neq 0$) ?

Q12. Show that $\left| \frac{z - 3}{z + 3} \right| = 2$ represent a circle

Q13 Find the squareroot of the following complex number:

- i) $3+4i$ (ii) $12-5i$