

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

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

(i) $\sin 50^\circ + i \cos 50^\circ$

(ii) $\cos 70^\circ + i \cos 20^\circ$

Q4. Solve each of the following equations:-

(i) $\sqrt{3}x^2 - \sqrt{2}x + 2\sqrt{3} = 0$

(iv) $x^2 - \sqrt{2}xi + 12 = 0$

(ii) $x^2 + \frac{x}{\sqrt{2}} + 1 = 0$

(v) $3x^2 - 7xi + 6 = 0$

(iii) $3x^2 - 4x + \frac{20}{3} = 0$

Q5. Find the conjugate the following:-

(i) $\frac{1}{3 + 4i}$

(ii) $7 + 5i$

(iii) $\frac{1}{(2 - 5i)^2}$

(iv) $\frac{(3 - 2i)(2 + 3i)}{(1 + 2i)(2 - i)}$

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

(i) $(2 + \sqrt{3}i)^2$

(ii) $\frac{5 + \sqrt{2}i}{5 - \sqrt{2}i}$

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

(i) $\left(\frac{1}{3} + 3i\right)^3$

(ii) $(1 - i)^4$

(iii) $\frac{6 + 3i}{2 - i}$

(iv) $\left(\frac{1}{3} + \frac{7}{3}i\right) + \left(4 + \frac{1}{3}i\right) - \left(\frac{-4}{3} + i\right)$ (iv) $i^{26} + i^5$

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) $12 - 5i$