ZERO DOUBTS

MATHEMATICS (BY PANDEY SIR)

Class-12TH WEEKLY ASSIGNMENT (22- 28/06/24)

SATURDAY (22/06/24)

1. Let $z = 1 + i$ and $z_1 = \frac{1+i\bar{z}}{\bar{z}(1-z)+\frac{1}{z}}$. Then $\frac{12}{\pi} \arg(z_1)$ is equal to __. **[Ans: (9)]**
2. The value of $\left(\frac{1+\sin\frac{2\pi}{9}+i\cos\frac{2\pi}{9}}{1+\sin\frac{2\pi}{9}-i\cos\frac{2\pi}{9}}\right)^3$ is **[Ans: (c)]**

a) $-\frac{1}{2}(1 - i\sqrt{3})$
b) $\frac{1}{2}(1 - i\sqrt{3})$
c) $-\frac{1}{2}(\sqrt{3} - i)$
d) $\frac{1}{2}(\sqrt{3} + i)$

SUNDAY (23/06/24)

3. If for $z = \alpha + i\beta$, $|z + 2| = z + 4(1 + i)$, then $\alpha + \beta$ and $\alpha\beta$ are the roots of the equation **[Ans: (b)]**

a) $x^2 + 3x - 4 = 0$
b) $x^2 + 7x + 12 = 0$
c) $x^2 + x - 12 = 0$
d) $x^2 + 2x - 3 = 0$

4. Let the complex number $z = x + iy$ be such that $\frac{2z-3i}{2z+i}$ is purely imaginary. If $x + y^2 = 0$, then $y^4 + y^2 - y$ is equal to **[Ans: (c)]**

a) $\frac{2}{3}$
b) $\frac{3}{2}$
c) $\frac{3}{4}$
d) $\frac{4}{3}$

MONDAY (24/06/24)

5. If $|z_1| = |z_2| = \cdots = |z_n| = 1$, then $|z_1 + z_2 + \cdots + z_n|$ is always equal to: **[Ans: (b)]**

a) $|z_1| + |z_2| + \cdots + |z_n|$
b) $\left|\frac{1}{z_1} + \frac{1}{z_2} + \cdots + \frac{1}{z_n}\right|$
c) $\frac{1}{|z_1|} + \frac{1}{|z_2|} + \cdots + \frac{1}{|z_n|}$
d) None of these

6. The value of sum $\sum_{n=1}^{13}(i^n + i^{n+1})$, where $i = \sqrt{-1}$, equals **[Ans: (b)]**

a) i
b) $i - 1$
c) $-i$
d) 0

TUESDAY (25/06/24)

7. If $w = \alpha + i\beta$, where $\beta \neq 0$ and $z \neq 1$, satisfies the condition that $\left(\frac{w-\bar{w}z}{1-z}\right)$ is purely real, then the set of values of z is **[Ans: (b)]**
a) $|z| = 1, z \neq 2$
b) $|z| = 1$ and $z \neq 1$
c) $z = 2$
d) None of these
8. Let α, β be the roots of the equation $x^2 - x + 2 = 0$ with $Im(\alpha) > Im(\beta)$. Then $\alpha^6 + \alpha^4 + \beta^4 - 5\alpha^2$ is equal to____. **[Ans: (13)]**

WEDNESDAY (26/06/24)

9. Let $A = \left\{\theta \in \left(-\frac{\pi}{2}, \pi\right) : \frac{3+2i\sin\theta}{1-2i\sin\theta}\ is\ purely\ imaginary\right\}$. Then, the sum of the elements in A is **[Ans: (a)]**
a) $\frac{3\pi}{4}$
b) $\frac{5\pi}{6}$
c) π
d) $\frac{2\pi}{3}$
10. Let $S = \left\{z \in C - \{i, 2i\} : \frac{z^2+8iz-15}{z^2-3iz-2} \in R\right\}, \alpha - \frac{13}{11}i \in S, \alpha \in R - \{0\}$, then $242\alpha^2$ is equal to _____. **[Ans: (1680)]**

THURSDAY (27/06/24)

11. Let a, b, x and y be real numbers such that $a - b = 1$ and $y \neq 0$. If the complex number $z = x + iy$ satisfies $Im\left(\frac{az+b}{z+1}\right) = y$, then which of the following is(are) possible value(s) of x? **[Ans: (b, d)]**
a) $1 - \sqrt{1+y^2}$
b) $-1 - \sqrt{1-y^2}$
c) $1 + \sqrt{1+y^2}$
d) $-1 + \sqrt{1-y^2}$
12. Let $z_1 = a + ib$ and $z_2 = c + id$ are complex numbers such that $|z_1| = |z_2| = 1$ and $Re(z_1\overline{z_2}) = 0$, then the pair of complex numbers $w_1 = a + ic$ and $w_2 = b + id$ satisfies **[Ans: (a, b, c)]**
a) $|w_1| = 1$
b) $|w_2| = 1$
c) $Re(w_1\overline{w_2}) = 0$
d) None of these

FRIDAY (28/06/24)

13. Let $S = \{z = x + iy: \frac{2z-3i}{4z+2i}\ is\ a\ real\ number\}$. Then which of the following is not correct? **[Ans: (b)]**

a) $y + x^2 + y^2 \neq -\frac{1}{4}$
b) $(x, y) = \left(0, -\frac{1}{2}\right)$
c) $x = 0$
d) $y \in \left(-\infty, -\frac{1}{2}\right) \cup \left(-\frac{1}{2}, \infty\right)$

14. Let z_1 and z_2 be complex numbers such that $z_1 \neq z_2$ and $|z_1| = |z_2|$. If z_1 has positive real part and z_2 has negative imaginary part, then $\frac{z_1+z_2}{z_1-z_2}$ may be

[Ans: (a, d)]

a) Zero
b) real and positive
c) real and negative
d) purely imaginary