DPP
DAILY PRACTICE PROBLEMS

CLASS : XIth
DATE :

Solutions

SUBJECT : MATHS
DPP NO. : 4

Topic :- COMPLEX NUMBERS AND QUADRATIC EQUATIONS

1. The solution set of the inequation $|x| - 1 < 1 - x$, is
   a) $(-1, 1)$ b) $(0, \infty)$ c) $(-1, \infty)$ d) None of these

2. If $(\sqrt{3} + i)^{10} = a + ib$, then a and b are respectively
   a) 128 & $128\sqrt{3}$ b) 64 & $-64\sqrt{3}$ c) 512 & $-512\sqrt{3}$ d) None of these

3. The number of real solutions of the equation $(5 + 2\sqrt{6})^{x^2-3} + (5 - 2\sqrt{6})^{x^2-3} = 10$, is
   a) 2 b) 4 c) 6 d) None of these

4. Number of roots of the equation $x - \frac{2}{x-1} = 1 - \frac{2}{x-1}$ is
   a) One b) Two c) Infinite d) None of these

5. The smallest positive integer n for which $(1 + i)^{2n} = (1 - i)^{2n}$ is
   a) 1 b) 2 c) 3 d) 4

6. If $\frac{z-1}{z+1}$ is purely imaginary number $(z \neq -1)$, then $|z|$ is equal to
   a) 1 b) 2 c) 3 d) 4

7. If one vertex of a square whose diagonals intersect at the origin is $3(\cos\theta + i\sin\theta)$, then the two adjacent vertices are
   a) $\pm 3(\sin\theta - i\cos\theta)$ b) $\pm(\sin\theta + i\cos\theta)$ c) $\pm(\cos\theta - i\sin\theta)$ d) None of these

8. If the sum of the roots of the equation $ax^2 + bx + c = 0$ is equal to the sum of the squares of their reciprocals of their reciprocals, then
   a) c^2b, a^2c, b^2a are in A.P.
   b) c^2b, a^2c, b^2a are in G.P.
   c) $\frac{b}{c}, \frac{a}{b}, \frac{c}{a}$ are in G.P.
   d) $\frac{a}{b}, \frac{b}{c}, \frac{c}{a}$ are in G.P.

9. In the argand plane, if O, P and Q represent respectively the origin O and the complex numbers z and $z + iz$ respectively, then $\angle OPQ$ is
   a) $\frac{\pi}{4}$ b) $\frac{\pi}{3}$ c) $\frac{\pi}{2}$ d) $\frac{2\pi}{3}$

10. If $n \in Z$, then $\frac{2^n}{(1-i)^{2n}} + \frac{(1+i)^{2n}}{2^n}$ is equal to

a) 0 b) 2 c) $[1 + (-1)^n]i^n$ d) None of these

11. Let α,β be the roots of the equation $x^2 - px + r = 0$ and $\frac{\alpha}{2}, 2\beta$ be the roots of the equation $x^2 - qx + r = 0$. Then the value of r is

a) $\frac{2}{9}(p-q)(2q-p)$ b) $\frac{2}{9}(q-p)(2p-q)$ c) $\frac{2}{9}(q-2p)(2q-p)$ d) $\frac{2}{9}(2p-q)(2q-p)$

12. If ω is an imaginary cube root of unity, then $(1 + \omega - \omega^2)^7$ equals

a) $128\,\omega$ b) $-128\,\omega$ c) $128\,\omega$ d) $-128\,\omega^2$

13. If $z + z^{-1} = 1$, then $z^{100} + z^{-100}$ is equal to

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

14. $\frac{3 + 2i\sin\theta}{1 - 2i\sin\theta}$ will be purely imaginary, if θ is equal to

a) $2n\pi \pm \frac{\pi}{3}$ b) $n\pi + \frac{\pi}{3}$ c) $n\pi \pm \frac{\pi}{3}$ d) None of these

15. If $x^2 + 2ax + 10 - 3a > 0$ for all $x \in R$, then

a) $-5 < a < 2$ b) $a < -5$ c) $a > 5$ d) $2 < a < 5$

16. Let z_1,z_2 be two complex numbers such that $z_1 + z_2$ and z_1z_2 both are real, then

a) $z_1 = -z_2$ b) $z_1 = \overline{z_2}$ c) $z_1 = -\overline{z_2}$ d) $z_1 = z_2$

17. If $\text{Im}\left(\frac{2z+1}{iz+1}\right) = -2$, then locus of z is

a) A circle b) A parabola c) A straight line d) None of these

18. Let $'z'$ be a complex number and $'a'$ be a real parameter such that $z^2 + ax + a^2 = 0$, then

a) Locus of z is a pair of straight lines b) Locus of z is a circle

c) $\arg(z) = \pm\frac{5\pi}{3}$ d) $|z| = -2|a|$

19. The points z_1, z_2, z_3, z_4 in the complex plane are the vertices of a parallelogram taken in order, iff

a) $z_1 + z_4 = z_2 + z_3$ b) $z_1 + z_3 = z_2 + z_4$ c) $z_1 + z_2 = z_3 + z_4$ d) None of these

20. If a real valued function f of a real variable x is such that $\frac{1}{(1+x)(1+x^2)} = \frac{A}{1+x} + \frac{f(x)}{1+x^2}$, then $f(x)$ is equal to

a) $\frac{1-x}{2}$ b) $\frac{x^2+1}{2}$ c) $1 - x$ d) None of these