

Tarun Classes of Mathematics

IIT-JEE Mains | CBSE | PU-CET | NDA

Talwara Township, Hoshiarpur | +91 9463672753 | tarunclasses.in

Complex Numbers

Subjects : Maths

Practice Questions and Pyqs

Maths - Section A (MCQ.)

1. If α and β are the roots of the equation $x^2 + x + 1 = 0$ then $\alpha^{2026} + \beta^{2026} =$
A) -1 B) 0 C) 1 D) 2
2. If $x = \sqrt{-1 - \sqrt{-1 - \sqrt{-1 - \dots \infty}}}$, where ω is a non-real complex cube root of unity, then the value of x is...
A) 1 B) -1 C) $-\omega$ D) ω^2
3. If ω is a complex cube root of unity, then the value of the expression $2\left(1 + \frac{1}{\omega}\right)\left(1 + \frac{1}{\omega^2}\right) + 3\left(2 + \frac{1}{\omega}\right)\left(2 + \frac{1}{\omega^2}\right) + \dots + (n+1)\left(n + \frac{1}{\omega}\right)\left(n + \frac{1}{\omega^2}\right)$ is...
A) $\left[\frac{n(n+1)}{2}\right]^2 + n$ B) $\left[\frac{n(n+1)}{2}\right]^2 - n$
C) $\left[\frac{n(n+1)}{2}\right]^2$ D) $\left[\frac{n(n-1)}{2}\right]^2$
4. If ω is a complex cube root of unity, then the value of $\sin\left[\pi(\omega^{10} + \omega^{23}) - \frac{\pi}{4}\right] =$
A) $-\frac{\sqrt{3}}{2}$ B) $-\frac{1}{\sqrt{2}}$ C) $\frac{1}{\sqrt{2}}$ D) $\frac{\sqrt{3}}{2}$
5. The value of $\left(\frac{-1+i\sqrt{3}}{2}\right)^{18} + \left(\frac{-1-i\sqrt{3}}{2}\right)^{18}$ is
A) 2 B) 35 C) $\sqrt{3}$ D) $\frac{\sqrt{3}}{2}$
6. If n is a positive integer, then $(1 + i\sqrt{3})^{2n} + (1 - i\sqrt{3})^{2n}$ is equal to
A) $2^{2n+1} \cos\left(\frac{2n\pi}{3}\right)$ B) $2^{2n} \cos\left(\frac{n\pi}{3}\right)$
C) $2^{2n+1} \cos\left(\frac{n\pi}{3}\right)$ D) $2^n \cos\left(\frac{2n\pi}{3}\right)$
7. $\frac{(\cos 2\theta + i \sin 2\theta)^7}{(\cos 4\theta + i \sin 4\theta)^3} =$
A) $\cos 2\theta + i \sin 2\theta$ B) $(\cos 2\theta + i \sin 2\theta)^4$ C) $\cos 4\theta + i \sin 4\theta$ D) $(\cos 4\theta + i \sin 4\theta)^{-2}$
8. The smallest positive integer n for which $\frac{(1+i)^n}{(1-i)^{n-2}}$ is a real number, is ...
A) 1 B) 2 C) 3 D) 4
9. If $-1 + \sqrt{-3} = re^{i\theta}$, then the value of θ is

A) $-\frac{2\pi}{3}$

B) $\frac{\pi}{3}$

C) $-\frac{\pi}{3}$

D) $\frac{2\pi}{3}$

10. The polar form of the complex number $z = \frac{1}{1+i}$, (where $i = \sqrt{-1}$) is

A) $\frac{1}{\sqrt{2}} \left(\cos \frac{7\pi}{4} + i \sin \frac{7\pi}{4} \right)$

B) $\frac{1}{\sqrt{2}} \left(\cos \frac{\pi}{4} + i \sin \frac{\pi}{4} \right)$

C) $\frac{1}{2} \left(\cos \frac{\pi}{4} + i \sin \frac{\pi}{4} \right)$

D) $\frac{1}{2} \left(\cos \frac{7\pi}{4} + i \sin \frac{7\pi}{4} \right)$

11. If $z = \sum_{n=0}^{2026} i^n$, where $i = \sqrt{-1}$, then one of the values of $\sqrt{z}$ is...

A) $e^{i\frac{\pi}{4}}$

B) $\frac{1}{\sqrt{2}} e^{i\frac{\pi}{4}}$

C) $e^{i\frac{\pi}{2}}$

D) $\frac{1}{\sqrt{2}} e^{i\frac{\pi}{2}}$

12. If $i = \sqrt{-1}$ then $\left[i^{18} + \left(\frac{1}{i} \right)^{25} \right]^3 =$

A) $4 + 4i$

B) $2 + 2i$

C) $4 - 4i$

D) $2 - 2i$

13. If $\frac{z-1}{2z+1}$ is an imaginary number and if it represents a circle then its radius is

A) $\frac{9}{16}$ units

B) $\frac{3}{4}$ units

C) $\frac{1}{4}$ units

D) $\frac{1}{2}$ units

14. The locus of the points represented by $|z+3| - |z-3| = 6$, where z is a complex number, is

A) Circle with radius 1 unit

B) Straight line with slope 1.

C) Parabola with focus (1, 0)

D) X-axis

15. The modulus of the square root of the conjugate of $-7 + 24\sqrt{-1}$ is

A) 3

B) 4

C) 16

D) 5

16. If a complex number $z = \frac{4+3i \sin \theta}{1-2i \sin \theta}$ (where $i = \sqrt{-1}$) is purely real, then the value of θ is

A) $(n+1)\frac{\pi}{2}, n \in \mathbb{Z}$

B) $(n-1)\frac{\pi}{2}, n \in \mathbb{Z}$

C) $(2n+1)\frac{\pi}{4}, n \in \mathbb{Z}$

D) $n\pi, n \in \mathbb{Z}$

17. Let z be the complex number such that $|z| + z = 3 + i$ where $i = \sqrt{-1}$, then $|z| =$

A) $\frac{\sqrt{34}}{3}$

B) $\frac{5}{3}$

C) $\frac{\sqrt{41}}{4}$

D) $\frac{5}{4}$

18. Argument of the complex number $z = \frac{13-5i}{4-9i}$, $i = \sqrt{-1}$ is

A) $\frac{\pi}{4}$

B) $\frac{\pi}{2}$

C) $\frac{\pi}{6}$

D) $\frac{\pi}{3}$

19. $z = \frac{3+2i \sin \theta}{1-2i \sin \theta}$, ($i = \sqrt{-1}$) will be purely imaginary if $\theta =$

A) $2n\pi \pm \frac{\pi}{8}$, where $n \in \mathbb{Z}$

B) $n\pi + \frac{\pi}{8}$, where $n \in \mathbb{Z}$

C) $n\pi \pm \frac{\pi}{3}$, where $n \in \mathbb{Z}$

D) $n\pi$, where $n \in \mathbb{Z}$

20. The complex numbers $\sin x + i \cos 2x$ and $\cos x - i \sin 2x$, ($i = \sqrt{-1}$) are conjugate to each other for,

A) $x = n\pi, n \in \mathbb{Z}$

B) $x = (n + \frac{1}{2})\pi, n \in \mathbb{Z}$

C) $x = (3n-1)\pi, n \in \mathbb{Z}$

D) No value of x

21. If $z^2 + z + 1 = 0$ then $(z^3 + \frac{1}{z^3})^2 + (z^4 + \frac{1}{z^4})^2 =$ where $z = w =$ complex cube root of unity

A) 4

B) 1

C) 5

D) 2

22. If $w = \frac{z}{z - \frac{1}{3}i}$ and $|w| = 1, i = \sqrt{-1}$, then z lies on
- A) circle. B) line. C) parabola. D) ellipse.
23. If $z = x + iy$ and $z^{1/3} = p + iq$, where $x, y, p, q \in \mathbb{R}$ and $i = \sqrt{-1}$, then value of $\left(\frac{x}{p} + \frac{y}{q}\right)$ is
- A) $p^2 - q^2$ B) $4(p^2 - q^2)$ C) $p^2 + q^2$ D) $4(p^2 + q^2)$
24. The real part of the principle value of 2^{-i} is
- A) $\sin(\log 2)$ B) $\cos\left(\frac{1}{\log 2}\right)$ C) $\cos\left[\log\left(\frac{1}{2}\right)\right]$ D) $\cos(\log 2)$
25. The value of $(1 + i)^5(1 - i)^7$
- A) -64 B) -64 i C) 64 i D) 64
26. Let z be a complex number such that $|z| + z = 3 + i, i = \sqrt{-1}$, then $|z|$ is equal to
- A) $\frac{5}{4}$ B) $\frac{\sqrt{41}}{4}$ C) $\frac{\sqrt{34}}{3}$ D) $\frac{5}{3}$
27. The value of $\frac{i^{248} + i^{246} + i^{244} + i^{242} + i^{240}}{i^{249} + i^{247} + i^{245} + i^{243} + i^{241}}$, ($i = \sqrt{-1}$) is
- A) i B) 1 C) -1 D) $-i$
28. If $x = -2 - \sqrt{3}i$, where $i = \sqrt{-1}$, then the value of $2x^4 + 5x^3 + 7x^2 - x + 41$ is
- A) 6 B) -6 C) 75 D) -76
29. If $\left(\frac{1-i}{1+i}\right)^{100} = a + ib$, where, $a, b \in \mathbb{R}$ and $i = \sqrt{-1}$, then (a, b) is equal to
- A) (1, 0) B) (0, 1) C) (-1, 2) D) (2, -1)
30. If the complex number $z = x + iy$, where $i = \sqrt{-1}$, satisfies the condition $|z + 1| = 1$, then z lies on
- A) X-axis. B) circle with centre (1, 0) and radius 1 unit.
C) circle with centre (-1, 0) and radius 1 unit. D) Y-axis.

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Maths - Section A (MCQ.)

1 - A	2 - D	3 - A	4 - C	5 - A	6 - A	7 - A	8 - A	9 - D	10 - A
11 - A	12 - D	13 - B	14 - D	15 - D	16 - D	17 - B	18 - A	19 - C	20 - D
21 - C	22 - B	23 - B	24 - C	25 - B	26 - D	27 - D	28 - A	29 - A	30 - C

