MATHS

BOOKS - NAGEEN MATHS (HINGLISH)

COMPLEX NUMBERS AND QUADRATIC EQUATION

Solved Examples

1. Find the values of the following :

(i) i^{73}

(ii) i^{-6}

(iii) $\frac{1}{i}$

Watch Video Solution

Watch Video Solution

2. Simplify the following :

(i) $1 + i^5 + i^{10} + i^{15}$

(ii) $(1+i)^4 + \left(1 + \frac{1}{i}\right)^4$

(iii) $i^n + i^{n+1} + i^{n+2} + i^{n+3}$

Watch Video Solution

3. Simplify $\sqrt{-16} \times \sqrt{-25}$.

A. -20

B. 20

C. 20i

D. None of these

Answer: A

Watch Video Solution

4. $(-i)^{4n+3}$, where n Is a positive integer.

Watch Video Solution

5. Convert each of the following in the form of (a + ib) :

(i) $3(1+i)-2(2+3i)$

(ii) $\frac{1}{4-5i}$

(iii) $(1-2i)^{-2}$

(iv) $\frac{2-3i}{3+5i}$

(v) $\left[\frac{1}{1-2i}+\frac{3}{1+i}\right]\left[\frac{3+4i}{2-4i}\right]$

Watch Video Solution

6. Convert $\frac{4-i\sqrt{3}}{4+i\sqrt{3}}$ in the form of $a+ib$.

Watch Video Solution

7. Convert $\left(\frac{1}{2}+2i\right)^3$ in the form of $a+ib$.

A. $-\frac{47}{2}-\frac{13}{2}i$

B. $-\frac{47}{8}-\frac{13}{2}i$

C. $-\frac{47}{8}-\frac{13}{4}i$

D. $-\frac{47}{4}-\frac{13}{4}i$

Answer: B

Watch Video Solution

8. Convert $\frac{(2+3i)^2}{2-i}$ in the form of $a+ib$ and find its conjugate.

Watch Video Solution

9. Find the conjugate of $\frac{(3-2i)(2+3i)}{(1+2i)(2-i)}$.

Watch Video Solution

10. Simplify : $\frac{1+2i}{1-2i} - \frac{1-2i}{1+2i}$

Watch Video Solution

11. Find the values of x and y: (i) $x + 3i = 6 - 9iy$ (ii) $(x + iy) - (3 - 2i) = 5 + i$ (iii) $i = x + 2yi$ (iv) $4x + i(x - y) = 2 - 5i$ (v) $(x + 2iy)(2 - i)^2 = 10(1 - i)$

Watch Video Solution

12. If $z = 2 - 3i$ show that $z^2 = 4z + 13 = 0$ and hence find the value of $4z^3 - 3z^2 + 169$.

Watch Video Solution

13. Write the order pair $(2, -3)$ in the form of $(a + ib)$.

Watch Video Solution

14. Prove that $\frac{3+i}{1+2i} + \frac{3-i}{1-2i}$ is a real number.

Watch Video Solution

15. Find the multiplicative inverse of $(4 + 3i)$.

Watch Video Solution

16. If z is a complex number and $z = \bar{z}$, then prove that z is a purely real number.

Watch Video Solution

17. Find the square roots of the following: $7 - 24i$ (ii) $5 + 12i$

Watch Video Solution

18. Find the square root of $(-8 - 6i)$.

A. $\pm(1 - 3i)$

B. $\pm(2 - 3i)$.

C. $\pm(1-2i)$.

D. $\pm(2-2i)$.

Answer: A

Watch Video Solution

19. Find real q such that $\frac{3+2i\sin\theta}{1-2i\sin\theta}$ is purely real.

Watch Video Solution

20. Convert the complex number $\left(1+i\sqrt{3}\right)$ into polar form.

A. $2\left(\cos\frac{\pi}{3}+i\sin\frac{\pi}{3}\right)$

B. $\left(\cos\frac{\pi}{3}+i\sin\frac{\pi}{3}\right)$

C. $2\left(\cos\frac{\pi}{6}+i\sin\frac{\pi}{6}\right)$

D. None of these

Answer: A

Watch Video Solution

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

Watch Video Solution

22. If $z_1=2-i, z_2=1+i$, find $\left|\frac{z_1+z_2+1}{z_1-z_2+i}\right|$

Watch Video Solution

23. If z is a complex number such that $|z| = 1,$ prove that $\frac{z-1}{z+1}$ is purely imaginary, what will by your conclusion if $z = 1$?

Watch Video Solution

24. Solve the equation $x^2 + 2 = 0.$

Watch Video Solution

25. Solve the equation $x^2 + 9 = 0$ by factorization method.

Watch Video Solution

26. Solve the equation $x^2 - 6x + 25 = 0$ by factorization method.

A. $4 \pm 4i$

B. $3 \pm 3i$

C. $3 \pm 4i$

D. $2 \pm 4i$

Answer: C

Watch Video Solution

27. Solve the equation $x^2 + x + \frac{1}{\sqrt{3}} = 0$

Watch Video Solution

28. Solve the equation $x^2 + 2ix + 15 = 0.$

Watch Video Solution

29. Solve the equation $x^2 - \left(2\sqrt{2} + 3i\right)x + 6i\sqrt{2} = 0$ by factorization method.

Watch Video Solution

30. Solve the eqution

$x^2 + ix\sqrt{3} + 18 = 0.$

A. $2\sqrt{2}i$ and $-3\sqrt{2}i.$

B. $2\sqrt{3}i$ and $-3\sqrt{2}i.$

C. $2\sqrt{3}i$ and $-2\sqrt{3}i.$

D. $2\sqrt{3}i$ and $-3\sqrt{3}i.$

Answer: D

Watch Video Solution

31. Solve the following quadratic equation:

$x^2 - (2+i)x - (1-7i) = 0$

A. $(3-i)$ and $(-1+2i)$

B. $(3+i)$ and $(-1+2i)$

C. $(3+i)$ and $(-1-2i)$

D. $(3+i)$ and $(1+2i)$

Answer: A

Watch Video Solution

Exercise 5 A

1. Simplify the following :

(i) i^{97}

(ii) i^{8}

(iii) $\frac{1}{i^3}$

(iv) $(-i)^{14}$

(v) i^{-22}

(vi) i^{-63}

Watch Video Solution

2. Find the values of the following : (i) $i^7 + i^{17} + i^{12}$ (ii) $i^{11} + i^{-11}$ (iii) $i^3 + \frac{1}{i^3}$ (iv) $1 + i^2 + i^6 + i^8$

Watch Video Solution

3. Show that : $i^{101} + i^{102} + i^{103} + i^{104} = 0$

Watch Video Solution

4. find the value of $\frac{1}{i}+\frac{1}{i^2}+\frac{1}{i^3}+\frac{1}{i^4}$

A. 0

B. 1

C. 2

D. -1

Answer: A

Watch Video Solution

5. Show that $6i^{50}+5i^{17}-i^{11}+6i^{28}$ is an imaginary number.

Watch Video Solution

6. Show that $i^{15} + i^{17} + i^{19} + i^{21} + i^{24}$ is a real number.

Watch Video Solution

7. Simplify the following :

(i) $\sqrt{-25} \times \sqrt{-36}$

(ii) $\sqrt{-25} \times \sqrt{49}$

Watch Video Solution

8. Simplify : $3\sqrt{-16} - 2\sqrt{-9} + 4\sqrt{-36}$

Watch Video Solution

9. Simplify the following :

(i) $\left[i^{19}+\frac{1}{i^{25}}\right]^2$

(ii) $\left[i^5-\frac{1}{i^3}\right]^4$

Watch Video Solution

Exercise 5 B

1. Convert the following in the form of $(a+ib)$:

(i) $(1+i)^4$

(ii) $\left(-3+\frac{1}{2}i\right)^3$

(iii) $(1-i)(3+4i)$

(iv) $(1+i)(1+2i)(1+3i)$

(v) $\frac{3+5i}{6-i}$

(vi) $\frac{(2+3i)^2}{2+i}$

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

(viii) $(2-i)^{-3}$

Watch Video Solution

2. Convert the following in the polar form : (i) $\frac{1+7i}{(2-i)^2}$ (ii) $\frac{1+3i}{1-2i}$

Watch Video Solution

3. Perform the indicated operation and find the result in the form $a+ib$: $\frac{3-\sqrt{-16}}{1-\sqrt{-9}}$

Watch Video Solution

4. Prove that $\left(\frac{-1+i\sqrt{3}}{2}\right)^3$ is a positive integer.

Watch Video Solution

5. Convert $\left[\frac{3+2i}{3-2i}+\frac{3-2i}{3+2i}\right]$ in the form of $(a+ib)$.

Watch Video Solution

6. Prove that : (i) $\sqrt{i}=\frac{1+i}{\sqrt{2}}$ (ii) $\sqrt{-i}=\frac{1-i}{\sqrt{2}}$ (iii) $\sqrt{i}+\sqrt{-i}=\sqrt{2}$

Watch Video Solution

7. Find the sum and product of the complex number $(3-4i)$ with its conjugate.

A. $Sum = 6, Product = 25$

B. $Sum = 25, Product = 5$

C. $Sum = 16, Product = 64$

D. none

Answer: A

Watch Video Solution

8. Find the sum and product of the complex number $(-1+2i)$ with its conjugate.

Watch Video Solution

9. Find the multiplicative inverse of the following complex number: $\left(2+\sqrt{3}i\right)^2$

Watch Video Solution

10. Write the following in the form of ordered pair :

(i) $3-2i$

(ii) $a+bi$

(iii) $-3-2i$

Watch Video Solution

11. Convert the following in the form of a complex number :

(i) $(2, -5)$

(ii) $(-3, 1)$

(iii) $(0, -2)$

Watch Video Solution

12. Find the values of x and y from the following : (i)

$(3x-7)+2iy = -5y+(5+x)i$ (ii)

$2xi+12 = 3y-6i$ (iii) $z = x+iy$ and $i(z+2)+1=0$

(iv) $\frac{(1+i)x-2i}{3+i}+\frac{(2-3i)y+i}{3-i} = i$ (v)

$(3x-2iy)(2+i)^2 = 10(1+i)$

Watch Video Solution

13. If $z = 1 + 2i$, show that $z^2 - 2z + 5 = 0$. Hence find the value of $z^3 + 7z^2 - z + 16$.

Watch Video Solution

14. $Z = -5 + 4i$then $Z^4 + 9Z^3 + 35Z^2 - Z + 4 =$

Watch Video Solution

15. If $z_1 = 2 - i, z_2 = 1 + 2i,$ then find the value of the following :

(i) $Re\left(\frac{z_1 \cdot z_2}{\bar{z}_2}\right)$

(ii) $Im(z_1 \cdot \bar{z}_2)$

Watch Video Solution

16. If $x + iy = \frac{a + ib}{a - ib}$, prove that $x^2 + y^2 = 1$.

Watch Video Solution

17. $(x + iy)^{\frac{1}{3}} = (a + ib)$ then prove that $\left(\frac{x}{a} + \frac{y}{b}\right) = 4(a^2 - b^2)$

Watch Video Solution

18. If $= \frac{(a^2 + 1)^2}{2a - i} = x + iy,$ then when is the value of $x^2 + y^2$?

Watch Video Solution

19. Write the least positive integral value of n for which $\left(\frac{1+i}{1-i}\right)^n$ is real.

Watch Video Solution

20. The complex number z is purely imaginary , if

Watch Video Solution

21. If $a^2+b^2=1$. Then $\frac{1+b+ia}{1+b-ia}=$

Watch Video Solution

22. Find the real values of θ for which the complex number $\frac{1+i\cos\theta}{1-2i\cos\theta}$ is purely real.

Watch Video Solution

23. Find the square root of the following :

(i) $3-4i$

(ii) $4+6i\sqrt{5}$

(iii) $-i$

(iv) $8i$

(v) $-7+24i$

(vi) $-24-10i$

Watch Video Solution

24. If $x + iy = \frac{3}{2 + \cos\theta + i\sin\theta}$, then show that $x^2 + y^2 = 4x - 3$

Watch Video Solution

25. The sum and product of two complex numbers are real if and only if they are conjugate of each other.

Watch Video Solution

26. If $x = \cos\alpha + i\sin\alpha, y = \cos\beta + i\sin\beta,$ then prove that $\frac{x - y}{x + y} = i(\tan)\frac{\alpha - \beta}{2}$

Watch Video Solution

27. Prove that:

$x^4 = 4 = (x + 1 + i)(x + 1 - i)(x - 1 + i(x - 1 - i).)$

Watch Video Solution

28. Evaluate : $\left(4 + 3\sqrt{-20}\right)^{1/2} + \left(4 - 3\sqrt{-20}\right)^{1/2}$

View Text Solution

Exercise 5 C

1. Convert the following into polar form :

(i) $-1 + i\sqrt{3}$

(ii) $1 - i$

(iii) $1 - \frac{1}{i}$

(iv) $3 - 4i$

(v) $\sin 120^\circ - i\cos 120^\circ$

(vi) 2

Watch Video Solution

2. Find the modulus and argument of the following :

(i) $-\sqrt{3} + i$

(ii) $-1 - i\sqrt{3}$

(iii) $5 + 12i$

(iv) $3(\cos 300^\circ - i\sin 30^\circ)$

Watch Video Solution

3. Find the polar form of conjugate of $(1 - i)$.

Watch Video Solution

4. If $z = x + iy$ is any complex number and $|z - 1| = |z + 1|$ then show that $|z| = y$.

Watch Video Solution

5. Prove that $|z_1 + z_2|^2 = |z_1|^2$, if z_1 / z_2 is purely imaginary.

Watch Video Solution

6. Find the modulus of $\frac{1+i}{1-i} - \frac{1-i}{1+i}$.

Watch Video Solution

7. Convert the complex number $\frac{-16}{1+i\sqrt{3}}$ into polar form.

Watch Video Solution

8. If for the complex numbers z_1 and z_2, $|z_1 + z_2| = |z_1 - z_2|$, then $Arg(z_1) - Arg(z_2)$ is equal to

Watch Video Solution

9. Prove that the points, represented by complex numbers $(5+8i), (13+20i), (19+29i)$ are collinear.

Watch Video Solution

10. Find the area and nature of the triangle formed by the points represented by the complex numbers $(3+3i), (-3-3i)$ and $\left(-3\sqrt{3}+3\sqrt{3}i\right)$.

Watch Video Solution

11. If $z=x+iy$ such that the argument of $\frac{z-1}{z+1}$ is always $\frac{\pi}{4}$. Prove that $x^2+y^2-2y=1$

Watch Video Solution

12. Find the number of non-zero integral solutions of the equation $|1-i|^x = 2^x$.

Watch Video Solution

13. If $|z-2| = 2|z-1|$, then show that $|z|^2 = \frac{4}{3}Re(z)$.

Watch Video Solution

14. For any two complex number $z_1 and\, z_2$ prove that: $|z_1 + z_2| \leq |z_1| + |z_2|$

Watch Video Solution

Exercise 5 D

1. Solve the following equations by factorization method :

(i) $x^2 + 4 = 0$ (ii) $x^2 + 5 = 0$ (iii) $4x^2 + 9 = 0$ (iv) $x^2 - 4x + 29 = 0$ (v) $4x^2 - 12x + 45 = 0$

Watch Video Solution

2. Solve the following equations by Sridharacharya's formula :

(i) $x^2 + x + 4 = 0$

(ii) $2x^2 - 2x + 3 = 0$

(iii) $\sqrt{2}x^2 + x + \sqrt{2} = 0$

(iv) $x^2 - x + 2 = 0$

(v) $25x^2 - 30x + 11 = 0$

(vi) $x^2 + 3x + 5 = 0$

(vii) $x^2 - 14x + 58 = 0$

(viii) $x^2 + 13ix - 42 = 0$

(ix) $x^2 - 11ix - 30 = 0$

View Text Solution

3. Solve the following equations by factorization method :

$x^2 + 6ix - 9 = 0$

Watch Video Solution

4. Solve the following equations :

(i) $2x^2 - (3 + 7i)x - 3 + 9i = 0$

(ii) $(2 + i)x^2 - (5 - i)x + 2(1 - i) = 0$

(iii) $x^2 - (4+i)x + (5-i) = 0$

(iv) $x^2 - (5+5i)x + 13i = 0$

(v) $x^2 - (5+2i)x + (9+7i) = 0$

(vi) $x^2 - (5-i)x + (18+i) = 0$

View Text Solution

5. Find the quadratic equation whose one root is $(1-i)$.

Watch Video Solution

6. One root of the equation $ax^2 - 3x + 1 = 0$ is $(2+i)$.

Find the value of $'a'$ when a is not real.

View Text Solution

Exercise 5 E

1. The conjugate of the complex number $(a + ib)$ is :

A. $-a - ib$

B. $-a + ib$

C. $a - ib$

D. None of these

Answer: C

Watch Video Solution

2. Show that a real value of x will satisfy hte equation $(1 - ix)/(1 + ix) = a - ib$ if $a^2 + b^2 = 1, where a, b$

real.

A. 1

B. 0

C. -1

D. None of these

Answer: A

 Watch Video Solution

3. If $\frac{3+2i\sin\theta}{1-2i\sin\theta}$ is real , then general value of θ is :

A. $\frac{n\pi}{2}, n \in 1$

B. $n\pi, n \in 1$

C. $\frac{n\pi}{3}, n \in 1$

D. None of these

Answer: B

Watch Video Solution

4. Convert of the complex number in the polar form: $\sqrt{3} + i$

A. $2\left(\cos\frac{\pi}{6} + i\sin\frac{\pi}{6}\right)$

B. $2\left(\cos\frac{\pi}{6} - i\sin\frac{\pi}{6}\right)$

C. $2\left(\cos\frac{\pi}{6} - i\sin\frac{\pi}{6}\right)$

D. None of the above

Answer: A

Watch Video Solution

5. If z is a complex number and $z = \bar{z}$, then prove that z is a purely real number.

A. $Re(z) = 0$

B. $Im(z) = 0$

C. $Re(z) = Im(z)$

D. None of these

Answer: B

Watch Video Solution

6. If $x + iy = (1 + 4i)(1 + 5i)$, then $\left(x^2 + y^2\right)$ is equal to :

A. 17

B. 26

C. 442

D. None of these

Answer: C

Watch Video Solution

7. if the complex no z_1, z_2 and z_3 represents the vertices of an equilateral triangle such that $|z_1| = |z_2| = |z_3|$ then

relation among z_1, z_2 and z_3

A. -1

B. 0

C. 1

D. None of these

Answer: B

Watch Video Solution

8. Find the multiplicative inverse of $z = 3 - 2i$.

A. $\frac{1+2i}{5}$

B. $\frac{1-2i}{5}$

C. $\frac{1+2i}{\sqrt{5}}$

D. None of these

Answer: A

Watch Video Solution

9. The roots of the equation $x^2 + 6ix - 9 = 0$ are :

A. $\pm i$

B. $\pm 2i$

C. $\pm 3i$

D. None of these

Answer: C

Watch Video Solution

10. $(1+i)^4+(1-i)^4$ is equal to

A. 8

B. -4

C. -8

D. None of these

Answer: C

Watch Video Solution

Exercise 5 F

1. If $z(\neq -1)$ is a complex number such that $\frac{z-1}{z+1}$ is purely imaginary, then $|z|$ is equal to

A. 2

B. 1

C. 3

D. None of these

Answer: B

Watch Video Solution

2. Write the least positive integral value of n for which $\left(\frac{1+i}{1-i}\right)^n$ is real.

A. 0

B. 2

C. 4

D. None of these

Answer: C

Watch Video Solution

3. If $arg\left(\frac{z-1}{z+1}\right) = \frac{\pi}{2}$ then the locus of z is

A. parabola

B. circle

C. pair of two straight lines

D. None of the above

Answer: B

Watch Video Solution

4. If $z = x + iyandw = \frac{1 - iz}{z - i}$, show that $|w| = 1z$ is purely real.

A. imaginary axis

B. real axis

C. unit circle

D. None of these

Answer: B

Watch Video Solution

5. For any two complex numbers z_1 and z_2, we have $|z_1 + z_2|^2 = |z_1|^2 + |z_2|^2$, then

A. $Re\left(\frac{z_1}{z_2}\right) = 0$

B. $Im\left(\frac{z_1}{z_2}\right) = 0$

C. $Re(z_1 z_2) = 0$

D. $Im(z_1 z_2) = 0$

Answer: A

Watch Video Solution

6. Find the complex number z satisfying the equations $\left|\frac{z-12}{z-8i}\right| = \frac{5}{3}, \left|\frac{z-4}{z-8}\right| = 1$

A. $6+3i$

B. $6+8i, 6+17i$

C. $6+8i, 6+4i$

D. $6+17i$

Answer: B

Watch Video Solution

7. If $|z_1| = |z_2| = |z_3| = \ldots\ldots = |z_n| = 1$, then $|z_1 + z_2 + z_3 + \ldots\ldots + z_n| =$

A. n

B. $\left|\frac{1}{z}+\frac{1}{z_2}+\ldots+\frac{1}{z_n}\right|$

C. 0

D. None of these

Answer: B

Watch Video Solution

8. both roots of the equation

$(x-a)(x-b)+(x-b)(x-c)+(x-c)(x-a)=0$

are

A. positive

B. negative

C. real

D. None of these

Answer: C

Watch Video Solution

9. If one root is common is equations $x^2 - ax + b = 0$ and $x^2 + bx - a = 0$, then :

A. $a = b$

B. $a - b = 1$

C. $a + b = 1$

D. None of these

Answer: B

Watch Video Solution

10. If $\alpha \neq \beta$ but $\alpha^2 = 5\alpha - 3$, $\beta^2 = 5\beta - 3$, then find the equation whose roots are $\frac{\alpha}{\beta}$ and $\frac{\beta}{\alpha}$.

A. $3x^2 - 19x - 3 = 0$

B. $3x^2 - 19x + 3 = 0$

C. $3x^2 + 19x + 3 = 0$

D. None of these

Answer: B

Watch Video Solution

Exercise 5 1

1. Express of the complex number in the form $a + ib$. $(5i)$

$\left(-\frac{3}{5}i\right)$

Watch Video Solution

2. $i^9 + i^{19}$

Watch Video Solution

3. i^{-39}

Watch Video Solution

4. Express of the complex number in the form $a + ib$.

$3(7 + i7) + i(7 + i7)$

Watch Video Solution

5. Express of the complex number in the form $a + ib$.

$(1 - i) - (-1 + i6)$

Watch Video Solution

6. Express of the complex number in the form $a + ib$.

$\left(\frac{1}{5} + i\frac{2}{5}\right) - \left(4 + i\frac{5}{2}\right)$

Watch Video Solution

7. Express each of the following in the form $a+ib$: $\left\{\left(\frac{1}{3}+\frac{7}{3}i\right)+\left(4+\frac{1}{3}i\right)\right\}-\left(-\frac{4}{3}+i\right)$

Watch Video Solution

8. $(1-i)^4$

Watch Video Solution

9. Express each of the following in the form $a+ib$: $\left(\frac{1}{3}+3i\right)^3$

Watch Video Solution

10. $\left(-2-\frac{1}{3}i\right)^3$

Watch Video Solution

11. Find the multiplicative of the following complex number: $4-3i$

Watch Video Solution

12. Find the multiplicative inverse of the complex number $\sqrt{5}+3i$

A. $\frac{\sqrt{6}}{14}-\frac{3}{14}i$

B. $\frac{\sqrt{2}}{14}-\frac{1}{14}i$

C. $\frac{\sqrt{3}}{14} - \frac{1}{14}i$

D. $\frac{\sqrt{5}}{14} - \frac{3}{14}i$

Answer: D

Watch Video Solution

13. $-i$

View Text Solution

14. Express the following expression in the form of $a + ib$

$$\frac{\left(3 + i\sqrt{5}\right)\left(3 - i\sqrt{5}\right)}{\left(\sqrt{3} + \sqrt{2}i\right) - \left(\sqrt{3} - i\sqrt{2}\right)}$$

A. $4+i\left(-\frac{7\sqrt{2}}{2}\right)$

B. $0+i\left(-\frac{7\sqrt{6}}{2}\right)$

C. $0+i\left(-\frac{14\sqrt{2}}{2}\right)$

D. $0+i\left(-\frac{7\sqrt{2}}{2}\right)$

Answer: D

Watch Video Solution

Exercise 5 2

1. $z=-1-i\sqrt{3}$ find argument and modulus of given complex number

A. -240°

B. -120°

C. 120°

D. 60°

Answer: B

Watch Video Solution

2. $z = -\sqrt{3} + i$ find modulus and argument

A. $1, 100^\circ$

B. $2, 150^\circ$

C. $3, 200^\circ$

D. $4, 250^\circ$

Answer: B

Watch Video Solution

3. $1 - i$

View Text Solution

4. $-1 + i$

View Text Solution

5. Polar form of $-1-i$ is

A. $\sqrt{2}\left(\cos\frac{5\pi}{4}+i\sin\frac{5\pi}{4}\right)$

B. $-\sqrt{2}\left(\cos\frac{5\pi}{4}+i\sin\frac{5\pi}{4}\right)$

C. $\sqrt{2}\left(\cos\frac{3\pi}{4}+i\sin\frac{3\pi}{4}\right)$

D. $-\sqrt{2}\left(\cos\frac{3\pi}{4}+i\sin\frac{3\pi}{4}\right)$

Answer: A

View Text Solution

6. The polar form of -3 is

A. $(\cos\pi+i\sin\pi)$

B. $\pm 3(\cos\pi + i\sin\pi)$

C. $3(\cos\pi + i\sin\pi)$

D. $-3(\cos\pi + i\sin\pi)$

Answer: C

View Text Solution

7. Polar form of $\sqrt{3} + i$ is

A. $-2\left(\cos\frac{\pi}{6} + i\sin\frac{\pi}{6}\right)$

B. $2\left(\cos\frac{\pi}{6} + i\sin\frac{\pi}{6}\right)$

C. $-2\left(\cos\frac{2\pi}{3} + i\sin\frac{\pi}{6}\right)$

D. $2\left(\cos\frac{2\pi}{3} + i\sin\frac{\pi}{6}\right)$

Answer: B

View Text Solution

8. i

View Text Solution

Exercise 5 3

1. Solve the equation:$x^2 + 3 = 0$

Watch Video Solution

2. Solve the equation:$2x^2 + x + 1 = 0$

Watch Video Solution

3. Solve the equation:$x^2 + 3x + 9 = 0$

Watch Video Solution

4. Solve the equation:$x^2 - x + 2 = 0$

Watch Video Solution

5. Solve the equation:$x^2 + 3x + 5 = 0$

Watch Video Solution

Watch Video Solution

6. Solve the equation:$x^2 - x + 2 = 0$

Watch Video Solution

7. Solve the equation: $\sqrt{2}x^2 + x + \sqrt{2} = 0$

Watch Video Solution

8. Solve the equation:$\sqrt{3}x^2 - \sqrt{2}x + 3\sqrt{3} = 0$

Watch Video Solution

9. $x^2 + x + \frac{1}{\sqrt{2}} = 0$

Watch Video Solution

10. $x^2 + \frac{x}{\sqrt{2}} + 1 = 0$

Watch Video Solution

Miscellaneous Exercise

1. Evaluate : $\left[i^{18} + \left(\frac{1}{i}\right)^{25}\right]^3$

A. $2i$

B. $3 - 2i$

C. $2 - 2i$

D. 2

Answer: C

Watch Video Solution

2. Prove that $Re(z_1 z_2) = Rez_1 Rez_2 - Imz_1 Imz_2$,

Watch Video Solution

3. Reduce $\left(\frac{1}{1-4i} - \frac{2}{1+i}\right)\left(\frac{3-4i}{5+i}\right)$ to the standard form.

Watch Video Solution

4. If $\frac{a+ib}{c+id} = x + iy$, prove that $\frac{a-ib}{c-id} = x - iy and \frac{a^2+b^2}{c^2+d^2} = x^2 + y^2.$

Watch Video Solution

5. Convert the following in the polar form : (i) $\frac{1+7i}{(2-i)^2}$ (ii) $\frac{1+3i}{1-2i}$

Watch Video Solution

6. Solve the equation : $3x^2 - 4x + \frac{20}{3} = 0$

Watch Video Solution

7. $x^2 - 2x + \frac{3}{2} = 0$

Watch Video Solution

8. Solve the equation :$27x^2 - 10x + 1 = 0$

Watch Video Solution

9. Solve the following quadratic: $21x^2 - 28x + 10 = 0$

Watch Video Solution

10. If $z_1 = 2 - i$, $z_2 = 1 + i$, find $\left| \frac{z_1 + z_2 + 1}{z_1 - z_2 + i} \right|$

Watch Video Solution

11. If $a+ib=\frac{(x+i)^2}{2x^2+1}$, prove that $a^2+b^2=\frac{\left(x^2+1\right)^2}{\left(2x^2+1\right)^2}$

Watch Video Solution

12. Let $z_1=2-i, z_2=-2+i$. Find (i) Re $\left(\frac{z_1z_2}{\bar{z}_1}\right)$ (ii) Im $\left(\frac{1}{z_1\bar{z}_1}\right)$

Watch Video Solution

13. Find the modulus and argument of the complex number $\frac{1+2i}{1-3i}$.

Watch Video Solution

14. Find the real numbers x *and* y, if $(x-iy)(3+5i)$ is the conjugate of $-6-24i$.

A. $x=3$ and $y=3$

B. $x=3$ and $y=-3$

C. $x=-3$ and $y=-3$

D. none of these

Answer: B

Watch Video Solution

15. Find the modulus of $\frac{1+i}{1-i} - \frac{1-i}{1+i}$.

Watch Video Solution

16. If $(x+iy)^3 = u+iv$, then show that $\frac{u}{x} + \frac{v}{y} = 4(x^2 - y^2)$.

Watch Video Solution

17. If α and β are different complex number with $|\beta| = 1$, then find $\left|\frac{\beta - \alpha}{1 - \bar{\alpha}\beta}\right|$

Watch Video Solution

18. Find the number of non-zero integral solutions of the equation $|1-i|^x = 2^x$.

Watch Video Solution

19. If $(a+ib)(c+id)(e+if)(g+ih) = A+iB$, then show that $(a^2+b^2)(c^2+d^2)(e^2+f^2)(g^2+h^2) = A^2+B^2$

Watch Video Solution

20. If $\left(\frac{1+i}{1-i}\right)^m = 1$, then find the least positive integral value of m.

A. 2

B. 4

C. 8

D. 16

Answer: B

 Watch Video Solution