MATHS

NCERT - FULL MARKS MATHEMATICS(TAMIL)

COMPLEX NUMBERS AND QUADRATIC EQUATIONS

Examples

1. If 4x + i(3x-y) + i(-6), where x and y are real numbers, then find the values of x and y.

2. Express the following in the form of a+bi,

(i) $(- 5i)\left(\frac{1}{8}i \right)$, (ii) $(- i)(2i)\left(- \frac{1}{8}i \right)^3$

3. Express $(5 - 3i)^3$ in the form a+ib.

4. Express $\left(-\sqrt{3}+\sqrt{-2}\right)\left(2\sqrt{3}-i\right)$, in the form of a+ib.

5. Find the multiplicative inverse of 2-3i.

6. Express the following in the form a+ib.

(i) $\dfrac{5 + \sqrt{2}i}{1 - \sqrt{2}i}$, (ii) i^{-35}

▶ **View Text Solution**

7. Represent the complex number $z = 1 + i\sqrt{3}$ in the polar form.

▶ **Watch Video Solution**

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

9. Solve $x^2 + 2 = 0$

10. Solve $x^2 + x + 1 = 0$

11. Solve $\sqrt{5}x^2 + x + \sqrt{5} = 0$

▶ **Watch Video Solution**

Miscellaneous Examples

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

▶ **Watch Video Solution**

2. Find the modulus and arguments of the complex numbers.

(i) $\dfrac{1+i}{1-i}$, (ii) $\dfrac{1}{1+i}$

> ▶ Watch Video Solution

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

.

> ▶ Watch Video Solution

4. Find real θ such that

$$\dfrac{3 + 2i \sin\theta}{1 - 2i \sin\theta}$$ is purely real.

▶ View Text Solution

5. Write the complex number in $a + ib$ form

$$2i(1 + 2i)$$

▶ Watch Video Solution

Exercise 5 1

1. Express each of the complex number given in the form of $a + ib$

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

▶ **Watch Video Solution**

2. Express each of the complex number given in the form of $a + ib$

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

▶ **Watch Video Solution**

3. Express each of the complex number given in the form of $a + ib$

i^{-39}

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

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

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

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

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

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

7. Express each of the complex number given in the form of $a + ib$

$$\left[\left(\frac{1}{3} + i\frac{7}{3}\right) + \left(4 + I\frac{1}{3}\right)\right] - \left(-\frac{4}{3} + i\right)$$

8. Express each of the complex number given in the form of $a + ib$

$$(1 - i)^4$$

9. Express each of the complex number given in the form of $a + ib$

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

10. Express each of the complex number given in the form of $a + ib$

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

11. Find the multiplicative invers of each of the complex number

4-3i

12. Find the multiplicative invers of each of the complex number

$\sqrt{5} + 3i$

13. Find the multiplicative invers of each of the complex number

$-i$

14. Express the following expression in the form of

$a + ib,$ $\dfrac{\left(3 + i\sqrt{5}\right)\left(3 - i\sqrt{5}\right)}{\left(\sqrt{3} + \sqrt{2}i\right) + \left(\sqrt{3} - \sqrt{2}i\right)}$

1. Find the modulus and principal argument of the following complex numbers .

$$-1 - i\sqrt{3}$$

▶ **Watch Video Solution**

2. Find modulus and argument of the complex numbers

$$z = -\sqrt{3} + i$$

▶ **Watch Video Solution**

3. Write the following complex numbers in the polar form :

$1 - i$

4. Convert each of the complex number in the polar form:

$-1 + i$

5. Convert each of the complex number in the polar form:

$$-1 - i$$

▶ Watch Video Solution

6. Convert each of the complex number in the polar form:

$$-3$$

▶ Watch Video Solution

7. Convert each of the complex number in the polar form:

$$\sqrt{3} + i$$

▶ Watch Video Solution

8. Convert each of the complex number in the polar form:

i

▶ Watch Video Solution

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

▶ View Text Solution

2. Find the roots $2x^2 + x + 1 = 0$

▶ Watch Video Solution

3. Find the roots of $x^2 + 3x + 9 = 0$

4. Find the roots of $-x^2 + x - 2 = 0$

5. Solve $x^2 + 3x + 5 = 0$

6. Solve $x^2 - x + 2 = 0$

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

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

9. Find the roots of $x^2 + x + \dfrac{1}{\sqrt{2}} = 0$

10. Find the roots of $x^2 + \dfrac{x}{\sqrt{2}} + 1 = 0$

Miscellaneous Exercises On Chapter 5

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

1. For any two complex numbers z_1 and z_2 prove that

(i)

$$Re(z_1 z_2) = Re(z_1)Re(z_2) - Im(z_1)Im(z_2).$$

▶ **Watch Video Solution**

Miscellaneous Exercises On Chapter 7

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

Miscellaneous Exercises On Chapter 8

1. If $x - iy = \sqrt{\dfrac{a-ib}{c-id}}$, prove that $x^2 + y^2 = \dfrac{a^2+b^2}{c^2+d^2}$.

1. Conver the following in the polar form:

(i) $\dfrac{1 + 7i}{(2 - i)^2}$, (ii) $\dfrac{1 + 3i}{1 - 2i}$

▶ **Watch Video Solution**

1. Solve:

$$3x^2 - 4x + \dfrac{20}{3} = 0$$

Miscellaneous Exercises On Chapter 11

1. $x^2 - 2x + \dfrac{3}{2} = 0$

Miscellaneous Exercises On Chapter 12

1. $27x^2 - 10x + 1 = 0$

Miscellaneous Exercises On Chapter 13

1. $21x^2 - 28x + 10 = 0$

Miscellaneous Exercises On Chapter 14

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

Miscellaneous Exercises On Chapter 15

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

Miscellaneous Exercises On Chapter 16

1. Let $z_1 = 2 - I$, $z_2 = -2 + i$, Find

(i) $\left(Re \dfrac{z_1 z_2}{\bar{z}_1} \right)$, (ii) $Im \left(\dfrac{1}{z_1 \bar{z}_1} \right)$

Miscellaneous Exercises On Chapter 17

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

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

▶ **Watch Video Solution**

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

▶ **Watch Video Solution**

1. Write the complex number in $a + ib$ form

$i(5i)$

▶ **Watch Video Solution**

1. If α and β are different complex numbers with $|\beta| = 1$, then find $\left| \dfrac{\beta - \alpha}{1 - \overline{\alpha}\beta} \right|$.

▶ **Watch Video Solution**

Miscellaneous Exercises On Chapter 22

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

▶ **Watch Video Solution**

1. Write the complex number in $a + ib$ form

$2i(2i)$

▶ **Watch Video Solution**

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