Class 11 Mathematics · Chapter 4: Complex Numbers and Quadratic Equations

Worksheet · 20 marks · about 40 minutes · based on NCERT

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1. The real number k for which $\frac{2 + ki}{1 - 2i}$ is purely real is [1]

(a) −4 (b) 4
(c) 1 (d) −1

2. Which of the following is equal to −1? [1]

(a) i^6 (b) i^8
(c) i^{-4} (d) i^9

3. For the complex number $z = -\sqrt{5} - 8i$, Im z is [1]

(a) −8i (b) 8
(c) −8 (d) $-\sqrt{5}$

4. In the Argand plane, the point representing the conjugate of $z = -3 + 2i$ lies in the [1]

(a) first quadrant (b) second quadrant
(c) third quadrant (d) fourth quadrant

5. The value of $i + i^2 + i^3 + \ldots + i^{50}$ is [1]

(a) 0 (b) i
(c) −1 − i (d) −1 + i

6. Find all complex numbers z for which $\bar{z} = iz$ and $|z| = \sqrt{2}$. [2]

7. Taking $a = -4$ and $b = -25$, show that $\sqrt{a} \times \sqrt{b} \neq \sqrt{(ab)}$. [2]

8. Write $z = \frac{2 + i}{1 - i}$ in the form a + ib. In which quadrant of the Argand plane does z lie, and how far is it from the origin? [2]

9. If x and y are real and $(x + iy)^2 = 7 + 24i$, find $x^2 + y^2$, and hence find all possible pairs (x, y). [3]

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10. For $z_1 = 1 + 2i$ and $z_2 = 3 - i$, show that $z_1 \bar{z}_2 + \bar{z}_1 z_2$ is a real number, and find it. [3]

11. Let $z_1 = 2 + i$ and $z_2 = 2 - i$. Using the identity $(z_1 + z_2)^3 = z_1^3 + z_2^3 + 3z_1z_2(z_1 + z_2)$, find $z_1^3 + z_2^3$. Why must the answer be real? [3]