

CHAPTER 5

COMPLEX NUMBERS AND QUADRATIC EQUATIONS

IMPROVEMENT 2018

1. Find the polar form of the complex

$$\text{number } \frac{1+i}{1-i} \quad (3)$$

2. Find the square roots of the complex number
- $3+4i$
- .

MARCH 2018

3. Consider the quadratic equation
- $x^2 + x + 1 = 0$

- a) Solve the quadratic equation. (2)
- b) Write the polar form of the roots. (2)
- c) If the two roots of the given quadratic are α and β , show that $\alpha^2 = \beta$

IMPROVEMENT 2107

4. a) The multiplicative inverse of the complex number $3+4i = \dots$ (1)
- b) Express in the Polar form: $z = 1+i\sqrt{3}$ (2)
- c) Solve the equation $x^2 + 3x + 5 = 0$ (2)

MARCH 2017

5. a) $i^{18} = \dots$
- i) 1 ii) 0 iii) -1 iv) i (1)
- b) Represent the complex number $\sqrt{3} + i$ in polar form. (2)
- c) Find the square root of the complex number $-8 - 6i$ (3)

IMPROVEMENT 2016

6. a) Write the real and imaginary parts of the complex number $-3 + \sqrt{-7}$. (1)
- b) Find the modulus and argument of the complex number $1 + i\sqrt{3}$ (2)
- c) Solve : $x^2 - 2x + 3 = 0$. (3)

MARCH 2016

7. a) Which one of the following is the real part and imaginary parts of the complex number: $\left(\frac{1+i}{1-i}\right) - \left(\frac{1-i}{1+i}\right)$?
- i) 0 and 1 ii) 0 and 2 iii) 3 and 2 iv) 0 and 4 (1)
- b) Express the complex number i in the Polar form. (2)
- c) Solve : $\sqrt{5}x^2 + x + \sqrt{5} = 0$ (3)

IMPROVEMENT 2015

8. a) What is i^{-35} ? (1)
- b) Represent the complex number $\sqrt{3} + i$ in the polar form. (2)
- c) Solve: $\sqrt{5}x^2 + x + \sqrt{5} = 0$. (3)

MARCH 2015

9. a) Represent the complex number $1 + i\sqrt{3}$ in the polar form. (2)
- b) Find the square root of the complex number $-7 - 24i$. (4)

IMPROVEMENT 2014

10. a) Solve the quadratic equation: $-x^2 + x - 2 = 0$ (2)

- b) Express i in the polar form .
 $r(\cos \theta + i \sin \theta)$. (3)

MARCH 2014

11. a) Solve $\sqrt{3}x^2 + x + \sqrt{3} = 0$ (2)
 b) Represent the complex number
 $z = 1 + i\sqrt{3}$ in the polar form. (3)

SEPTEMBER 2013

12. a) Express $\frac{1+i}{1-i}$ in the form $a+ib$. (2)
 b) Represent $\frac{1+i}{1-i}$ in polar form. (3)

MARCH 2013

13. a) Represent the complex number $\sqrt{3} + i$ in the
 polar form. (2)
 b) Solve : $\sqrt{5}x^2 + x + \sqrt{5} = 0$ (3)

SEPTEMBER 2012

14. i) Represent the complex number $1 + i\sqrt{3}$ in the
 polar form. (2)
 ii) Express $\frac{2+i}{2-i}$ in the form $a+ib$. (3)

MARCH 2012

15. Consider the complex number, $Z = \frac{5 - \sqrt{3}i}{4 + 2\sqrt{3}i}$
 a) Express Z in the form $a + ib$ (2)
 b) Express Z in the polar form. (3)

IMPROVEMENT 2011

16. Consider the equation $z^2 - 2z + 4 = 0$.
 i) Find two complex numbers satisfying this
 equation. (2)
 ii) Simplify $\frac{z_1}{z_2} + \frac{z_2}{z_1}$ (3)

MARCH 2011

17. Consider the complex number $Z = \frac{2+i}{(1+i)(1-2i)}$
 a) Express Z in the form $a+ib$. (2)
 b) Represent Z in the polar form. (3)

MARCH 2010

18. i) Express the complex number $z = \frac{5+i}{2+3i}$
 in the form $a + ib$ (2)
 ii) Represent z in the polar form. (3)

AUGUST 2009

19. i) Express the complex number $\frac{3 - \sqrt{-16}}{1 - \sqrt{-9}}$ in the
 form $a + ib$. (2)
 ii) Represent the complex number $z = 1 + i\sqrt{3}$ in
 the polar form. (2)
 iii) Solve the equation $ix^2 - x + 12i = 0$ (2)

MARCH 2009

20. a) Express the complex number
 $\frac{2-i}{(1-i)(1+2i)}$ in the form $a + ib$. (2)
 b) Find the polar form of the complex number
 $\sqrt{3} + i$ (2)
 c) Solve the quadratic equation:
 $27x^2 - 10x + 1 = 0$ (2)

