

Unit 4 Review Sheet

Simplify the following:

1. i^{45}

2. i^{33}

3. i^{98}

4. $i^9 + i^{10} - i^{89}$

5. $6i^{56} + 3i^7 + 9i^{765}$

6. $\sqrt{-36} + \sqrt{-49}$

Solve each of the following for x . Express any non-real answers in $a + bi$ form.

7. $2x^2 - 3x + 10 = 0$

8. $15x^2 - 11x = -2$

Express each of the following in $a+bi$ form

9. $(6 + 2i)(4 - 3i)$

10. $(12 + 5i) + (7 - 9i)$

11. $(6 - 8i) - (2 - 5i)$

12. $((4-i)-2(1-2i))^2$

13. $(1+2i)(2-4i)+3i(1-i)-i^3$

14. Find all the zeroes of $x^4 - x^3 - 12x^2 + 26x - 24 = 0$.

15. Given the roots $x = 1 - 2i$, $x = 1 + 2i$, $x = 7$, and $x = 3$, write the equation of the polynomial function these roots represent.

16. Compute the value of the discriminant of the quadratic equation in each part. Use the value of the discriminant to predict the number and type of solutions.

a) $x^2 + 2x + 1 = 0$

b) $x^2 + 4 = 0$

c) $x = 2x^2 + 5$

17. How many x-intercepts does the graph of the equation $P(x) = x^4 - 3x^2 - 4$ have? What are the coordinates of the x-intercepts?

18. Write the expression $x^3 + 3x^2 + x - 5$ in terms of linear factors.

19. Write the expression $x^4 - 3x^3 + 6x^2 - 12x + 8$ in terms of linear factors.