For all questions, answer E. "NOTA" means none of the above answers is correct. Also, given  then , and . (Hint: )

1. Multiplying any complex number by  results in a counterclockwise rotation through which angle?

A)  B)  C)  D)  E) NOTA

2. Evaluate .

A)  B)  C)  D) 

E) NOTA

3. How many 17th roots of 1 are in the second quadrant?

A)  B)  C)  D)  E) NOTA

4. Find .

A)  B)  C)  D)  E) NOTA

5. For how many positive real values of will  be a real number?

A)  B)  C)  D)  E) NOTA

6. Which of the following is equivalent to ?

A)  B)  C)  D)  E) NOTA

7. If the nine solutions of  are written in the form , where  and  are real, then find the product of those solutions with .

A)  B)  C)  D)  E) NOTA

8. Which of the following numbers is not complex?

A)  B)  C)  D)  E) NOTA

9. What is the graph of ?

A) Line B) Hyperbola C) Ellipse D) Parabola E) NOTA

10. What is ?

A)  B)  C)  D)  E) NOTA

11. In the Argand plane the roots of, when connected, form which of the following?

A) Regular Pentagon B) Regular Heptagon C) Regular Decagon

D) Regular Dodecagon E) NOTA

12. If is one of the imaginary roots of the equation , then find.

A)  B)  C)  D)  E) NOTA

13. Given that , which of the following equals ?

A)  B)  C)  D) 

E) NOTA

14. Evaluate .

A)  B)  C)  D) 

E) NOTA

15. In the complex plane, find the distance between  and .

A)  B)  C)  D)  E) NOTA

16. For natural  find the product of the roots of the general equation .

A)  B)  C)  D)  E) NOTA

17. What is the imaginary term in the expansion of ?

A)  B)  C)  D)  E) NOTA

18. Find the value of where .

A)  B)  C)  D)  E) NOTA

19. Find .

A)  B)  C)  D) 

E) NOTA

20. Find  where  and .

A)  B)  C)  D)  E) NOTA

21. Given that determine the product of the roots of .

A)  B)  C)  D)  E) NOTA

22. The number  is a solution of . Evaluate the determinant 

A)  B)  C)  D)  E) NOTA

23. Given that  and  are real, find  such that and  are roots of .

A)  B)  C)  D)  E) NOTA

24. Find the sum of the geometric series 

A)  B)  C)  D) 

E) NOTA

25. What is the domain of ?



A) B) C) D) E) NOTA



26. For what values of  will the function  have two imaginary roots?

A)  B)  C)  D) 

E) NOTA

27. Evaluate .

A) B)  C)  D)  E) NOTA

28.Evaluate 

A)  B)  C)  D)  E) NOTA

29. Which of the following is equivalent to ?

A)  B)  C)  D)  E) NOTA

30. Evaluate 

A)  B)  C)  D)  E) NOTA