

## The Exam questions of Linear Algebra and Mathematical Analysis 2023

1. Why economists use mathematics
2. Matrices and vectors
3. Elementary Matrix operations
4. Properties of matrix addition and subtraction
5. Matrix multiplication and its properties
6. Matrix transposition and its properties
7. Determinants of Square matrices. Properties of determinants
8. Linearly independent and dependent vectors
9. Inverse matrices
10. Laplace expansion for the determinants
11. Properties of inverse matrices
12. Using matrix inverse to solve systems of equations
13. Systems of linear equations. Cramer's rule
14. Gaussian elimination method
15. The trace operator. Some Special matrices
16. Introduction to mathematical analysis
17. Limits: One-sided limits.
18. Properties of Limits. Type of Limits
19. L'Hospital's rule and indeterminate forms
20. Continuity. Properties of continuous functions
21. Derivative and alternative notation
22. Derivative rules and functions
23. Properties of Limits. Algebra Limits
24. Derivative. Chain rule. Differentiation Rules. Table of derivatives
25. Indefinite Integrals
26. Properties indefinite integrals
27. Table of indefinite integrals
28. Definite integrals
29. Computing definite integrals
30. Basic indefinite integrals
31. Properties of definite integrals
32. Integration by parts
33. Integration by substitution
34. Integration by substitution. More complicated cases
35. Function of two or more variables. Cobb-Douglas function
36. Partial derivatives with two variables
37. Higher-order partial derivatives
38. Notations for derivative. Leibniz notation
39. Implicit differentiation
40. System of linear equations
41. Rank of a matrix and its properties
42. Differentiation and its rules
43. Absolute and relative extrema

44. First derivative test
45. Absolute maxima and minima
46. Critical points
47. Series and its properties
48. Convergence and divergence of series
49. The shape of a graph part I
50. The shape of a graph part II
51. Continuous function
52. Partial derivatives in economics
53. Numerical Integration
54. Midpoint, Trapezoidal rules
55. Definition of the definite integrals
56. Simpson's rule
57. Increasing and decreasing functions