UNEC

Final-I-19/20

Topics for students

№ 1. Determinants

1. Problem solving: Calculate the 3rd order determinant by the triangle, the expansion and the echelon methods.
2. Problem solving: Calculate the 3rd order determinant by the triangle, the expansion and the echelon methods.
3. Problem solving: Calculate the 3rd order determinant by the triangle, the expansion and the echelon methods.
4. Problem solving: Calculate the 3rd order determinant by the triangle, the expansion and the echelon methods.
5. Problem solving: Calculate the 3rd order determinant by the triangle, the expansion and the echelon methods.
6. Problem solving: Calculate the 3rd order determinant by the triangle, the expansion and the echelon methods.
7. Problem solving: Calculate the 4th order determinant by the expansion and the echelon methods.
8. Problem solving: Calculate the 4th order determinant by the expansion and the echelon methods.
9. Problem solving: Calculate the 4th order determinant by the expansion and the echelon methods.
10. Problem solving: Calculate the 4th order determinant by the expansion and the echelon methods.
11. Problem solving: Calculate the 4th order determinant by the expansion and the echelon methods.
12. Problem solving: Calculate the 4th order determinant by the expansion and the echelon methods.
13. Problem solving: Calculate the 4th order determinant by the expansion and the echelon methods.
14. Problem solving: Calculate the 4th order determinant by the expansion and the echelon methods.

№ 2. Matrices

15. Problem solving: Multiply the matrices.

16. Problem solving: Invert the 2nd order matrix with the verification.

17. Problem solving: Invert the 3rdorder matrix with the verification.

18. Problem solving: Define the rank of the matrix.

№ 3. Systems of linear equations

19. Problem solving: Solve the system of 3 linear equations with 3 unknowns by the substitution and the Gauss methods.

20. Problem solving: Solve the system of 3 linear equations with 3 unknowns by the determinant, the inverse matrix and the Jordan methods.

21. Problem solving: Show by the determinant method that the system of 2 linear equations with 2 unknowns has the infinite amount of solutions and give 3 integer solutions of this system.

22. Problem solving: Solve the system of 3 linear equations with 3 unknowns by the determinant, the inverse matrix and the Jordan methods.

23. Problem solving: Solve the system of 3 linear equations with 3 unknowns by the substitution and the Gauss methods.

24. Problem solving: Solve the system of 3 linear equations with 3 unknowns by the substitution and the Gauss methods.

25. Problem solving: Find the eigenvalues and eigenvectors of the 2nd order square matrix.

№ 4. Limits

26. Problem solving: Evaluate the limit of the given numeric sequence

27-29. Problem solving: Evaluate the limit of the given function

30-32. Problem solving: Evaluate the limit of the given function with the application of the 1st remarkable limit and its results

33-34. Problem solving: Evaluate the limit of the given function with the application of the 2nd remarkable limit and its results

№ 5. Derivatives

35. Problem solving: Find the derivative of the given function by the definition

36. Problem solving: Find the derivative of the power functions combination

37. Problem solving: Find the derivative of the simple functions combination

38. Problem solving: Find the derivative of the composite function

39-40. Problem solving: Find the derivative of the twice composite function

№ 6. Applications

41-42. Problem solving: Examine the given series for convergence with help of the d’Alembert’s test

43-44. Problem solving: Examine the given function for asymptotes

45. Problem solving: Find the derivative of the power functions combination with the application of the logarithmic differentiation

46. Problem solving: Find the derivative of the exponential-power function with the application of the logarithmic differentiation

47-49. Problem solving: Evaluate the given limit with help of L’Hospital’s rule

50. Problem solving: Evaluate the higher order derivative of the given function at the given point with help of the Leibniz’s formula

№7. Indefinite integrals.

51-54. Problem solving: Find the indefinite integral of the function with the linear-composite expression.

55. Problem solving: Find the indefinite integral by the method of the perfect square separation with the arctangent antiderivative.

56. Problem solving: Find the indefinite integral by the method of the perfect square separation with the arcsine antiderivative.

57-59. Problem solving: Find the indefinite integral by the method of the indefinite coefficients.

60. Problem solving: Find the indefinite integral of the logarithmic function.

61. Problem solving: Find the indefinite integral of the arcsine function.

62. Problem solving: Find the indefinite integral of the arctangent function.

63. Problem solving: Find the indefinite integral by parts integration with help of the introduction of the power function into the differential sign.

64. Problem solving: Find the indefinite integral by parts integration with help of the introduction of the exponential function into the differential sign.

65. Problem solving: Find the indefinite integral by parts integration with help of the introduction of the sine function into the differential sign.

66. Problem solving: Find the indefinite integral by parts integration with help of the introduction of the cosine function into the differential sign.

№8. Definite integrals.

67. Problem solving: Find the definite integral of the simple power function.

68. Problem solving: Find the definite integral of the linear-composite function.

69. Problem solving: Find the improper integral.

70. Problem solving: Examine the numerical series for convergence-divergence by the integral test.

№9. Theoretical questions.

71. The properties of the determinants.

72. The 2nd remarkable limit and its results.

73. The asymptotes.

74. The L’Hospital’s rule.

75. The Leibniz’s formula.