Questions for Exam of Higher Mathematics I

1. Determinants of the 2nd and the 3rd order.
2. The *n*th-order determinant , M_{ij} the minor and A_{ij} the cofactor of the element a_{ij}.
3. Expanding the *n*th-order determinant by the elements of the i^{th} row and the j^{th} column.
4. The operations with matrixes.
5. The inverse matrix.
6. Rank of matrix.
7. Systems of linear equations.
8. Gaussian elimination.
9. Cramer's rule.
10. Method of inverse matrix.
11. Fixed vectors and free vectors.
12. Linear operation on vectors.
13. Scalar product of two vectors.
14. Vector product of two vectors.
15. Mixed product of three vectors.
16. Straight line in a plane.
17. Straight line in tree-dimensional space.
18. Plane in tree-dimensional space.
19. Curves and surfaces of the second order.
20. The ellipse.
21. The hyperbola.
22. The parabola.
23. Functions of one variable, basic concepts and definitions.
24. Linear and quadratic functions.
25. Power functions.
26. Exponential functions.
27. Logarithmic functions.
28. Trigonometric functions.
29. Inverse functions.
30. Limit of function at a point, the left -hand and the right –hand limits.
31. Continuity of function at a point and on given interval.
32. Discontinuities of the first and second kinds.
33. Properties of limits of functions at a point.
34. The 1st remarkable limit.

35. The 2^{nd} remarkable limit.
36. Equivalent infinitesimals and infinities.
37.Derivatives and differential. The table of derivatives of elementary functions.
38. Differentiation rules.
39. Differentiation of composite and inverse functions.
40. Differentiation of power-exponential functions.
41. Differentiation of functions given in a parametric form.
42. Derivatives of higher orders, Leibniz formula.
43. L' Hospital's rule.