

1. Comparison between Newton-rapson and modified Newton-rapson methods.
2. What is the difference between jacobi and gauss-seidel iterative methods ?
3. What is the difference between gauss elemination and gauss-seidel iterative methods ?
4. What is the difference between Simpson and rectangle quadratic methods ?
5. What is the difference between trapezoidal and rectangle quadratic methods ?
6. What is the difference between trapezoidal and Simpson quadratic methods ?
7. What are the 2 types of interpolation polynomial methods?
8. What is the difference between Lagrange and Newton's method of interpolation?
9. Using Lagrange's interpolation formula find  $f(10)$  from the following table:

x	5	6	9	11
f(x)	12	13	14	16

10. Using Lagerange's interpolation formula find  $L(x)$  polinomial from the following table:

x	2	3	1	5
f(x)	14	5	4	7

11. Using Newton's interpolation formula find the value of function at  $x=2.5$  from the

x	2	3	4	5
f(x)	7	5	8	7

following table:

12. Using Newton's interpolation formula find  $f(x)$  polinomial from the following table:

x	2	3	1	5
f(x)	12	33	3	135

13. Interpolate the value of the function corresponding to  $X=4$  using Lagrange's interpolation formula from the following set of data:

X	2	3	5	8	12
f(X)	10	15	25	40	60

14. Interpolate the value of the function corresponding to  $X=4$  using Lagrange's interpolation formula from the following set of data:

X	2	3	5	8
f(X)	10	15	25	40

15. Solve following equation by the method of Secant with interval  $[1; 2]$  and  $\varepsilon = 10^{-1}$  :

$$x^3 - 2x - 1 = 0$$

16. Apply the Simpson's quadrature method to the solution of the following integral equation:  $y(x) = \int_1^3 \frac{dx}{(x^3+6)}$  ,  $n=4$

17. Apply the rectangular(center) quadrature method to the solution of the following integral equation:  $y(x) = \int_{-1}^2 \frac{6}{(x^2+1)}$  ,  $n=3$ ,  $x \in [0; 1]$

18. Apply the rectangular(center) method to the following integral equation :

$$y(x) = \int_2^5 \frac{4}{(x^2+6x)}$$
 ,  $n=4$

19. Apply the rectangular(all) method to the following integral equation :

$$y(x) = \int_3^5 \frac{4}{(x^2+x+1)}$$
 ,  $n=4$

20. Apply the Simpson's quadrature method to the solution of the following integral equation:  $y(x) = \int_1^7 \frac{3}{(3x^2+1)}$  ,  $n=3$

21. Apply the Simpson's quadrature method to the solution of the following integral equation:  $y(x) = \int_1^3 \frac{dx}{(2x^3+6)}$  ,  $n=3$

22. Apply the trapezoidal quadrature method to the solution of the following integral equation:  $y(x) = \int_1^4 \frac{3}{(3x^2+1)}$  ,  $n=3$

23. Apply the Simpson's quadrature method to the solution of the following integral equation:

$$y(x) = \int_1^4 \frac{3}{(3x^2+1)} \, , \quad n=3$$

24. Apply the trapezoidal quadrature method to the solution of the following integral equation :  $y(x) = \int_1^3 \frac{dx}{(x^3+6)}$   $n=4$ .

25. Solve following integral equation by the Simpson's quadrature formula :

$$y(x) = \int_{-1}^3 \frac{5}{(x^2+3)} \, , \quad n=3$$

26. Solve the system using Jacobi's Method with the following details: Using  $\mathbf{x}^{(0)} = (0, 0)$ , complete a table like the one below, doing  $n=3$  iterations:

$$10x_1 + 9x_2 = 19$$

$$8x_1 + 11x_2 = 19$$

27. Solve the system using Gauss-Seidel Method with the following details. Using  $\mathbf{x}^{(0)} = (0, 0)$ , complete a table like the one below, doing  $n=3$  iteration :

$$10x_1 + 9x_2 = 19$$

$$8x_1 + 11x_2 = 19$$

28. Use Newton's Method to determine  $x_3$  for  $f(x) = x^3 + 6x^2 + 8x - 5$

29. Solve the system using Gauss-Elimination Method

$$x+2y=3$$

$$2x+3y=1$$

30. Solve the system using Gauss-Elimination Method :

$$4x-5y=-6$$

$$2x-2y=1$$

31. Solve the system using Gauss-Seidel Method with the following details. Using  $\mathbf{x}^{(0)} = (0, 0)$ , complete a table like the one below, doing  $n=3$  iteration :

$$11x_1 + 10x_2 = 61$$

$$10x_1 + 12x_2 = 70$$

32. Solve the system using Jacobi's Method with the following details:

$$11x_1 + 10x_2 = 61$$

$$10x_1 + 12x_2 = 70$$

.Using  $\mathbf{x}^{(0)} = (1, 1)$ , complete a table like the one below, doing  $n=4$  iteration :

33. Solve the system using Jacobi's Method with the following details:

Using  $\mathbf{x}^{(0)} = (0, 0)$ , complete a table like the one below, doing  $n=3$  iteration :

$$2x_1 - x_2 = 8$$

$$x_1 + 4x_2 = -5$$

34. Solve following equation by the method of Secant with interval  $[0;1]$  and

$$\varepsilon = 10^{-1} : x^3 + 2x - 2 = 0$$

35. Use Simple iteration Method to determine  $x_n$  for

$$f(x) = x^3 - 2x - 1 \text{ .Let } \varepsilon = 10^{-1} \text{ and } x \in [1; 2]$$

36. Use Simple iteration Method to determine  $x_n$  for

$$f(x) = x^3 - x - 1 \text{ .Let } \varepsilon = 10^{-1} \text{ and } x \in [1; 2]$$

37. Use Simple iteration Method to determine  $x_n$  for

$$f(x) = x^3 - 3x - 1 \text{ .Let } \varepsilon = 10^{-1} \text{ and } x \in [1; 2]$$

38. Use Simple iteration Method to determine  $x_n$  for

$$f(x) = x^3 + x - 4 \text{ .Let } \varepsilon = 10^{-1} \text{ and } x \in [1; 2]$$

39. Use Simple iteration Method to determine  $x_n$  for

$$f(x) = x^3 + x - 3 \text{ .Let } \varepsilon = 10^{-1} \text{ and } x \in [1; 2]$$

40. Use Simple iteration Method to determine  $x_n$  for

$$f(x) = x^3 - 4x - 1 \text{ .Let } \varepsilon = 10^{-1} \text{ and } x \in [1; 2]$$

41. Use Newton's Method to determine  $x_3$  for

$$f(x) = x^3 + 7x^2 + 8x - 3 \text{ if } x_0 = 3$$

42. Use Modified Newton's Method to determine  $x_n$  for

$$f(x) = x^4 + x - 1 \text{ .Let } \varepsilon = 10^{-2} \text{ and } x \in [0; 1]$$

43. Use Modified Newton's Method to determine  $x_n$  for

$$f(x) = x^5 + x - 1 \text{ .Let } \varepsilon = 10^{-2} \text{ and } x \in [0; 1]$$

44. Solve following equation by the method of secant with initial value  $x_0 = 1$

and  $x_1 = 2$  ,  $\varepsilon = 10^{-2}$  :

$$x^3 + x - 3 = 0$$

45. Solve following equation by the method of secant with interval  $[1; 2]$  and  $\epsilon = 10^{-2}$  :  $x^3 - 2x - 1 = 0$