Numerical integration and differentiation

The objectives of the task: Strengthen the skills of calculation the definite integral.

Task Requirements: Calculate the definite integral.

Instructions for performing:

1. Calculate the definite integral by: - 1.8 points

    1.1) the trapezoidal rule - 0.6 points

    1.2) quadrature rules based on interpolating functions - 0.6 points

    1.3) integration of external functions - 0.6 points

2. Check result by the formula Newton – Leibniz. 0.8 points

3. Available Comments - 0.4 points.

Maximum evaluation are **3 points**

You need to calculate the definite integral using different commands in the command window, then then make a scan command window and send me the scan.

Variants of tasks.

1. $\int_{\pi/2}^{\pi} \frac{\sin x\, dx}{\cos^2 x + 1}$
2. $\int_{1}^{2} \frac{e^{\frac{1}{x}}}{x^2} dx$
3. $\int_{0}^{\pi/4} x\, tg^2 x\ dx$
4. $\int_{-1/2}^{1/2} \arccos 2x\ dx$
5. $\int_{1}^{5} \frac{7dx}{x}$
6. $\int_{-3}^{1} (2x^2 + 3x - 1)dx$
7. $\int_{0}^{8} \sqrt[5]{2x-1}\ dx$
8. $\int_{1}^{2} \left(\frac{4}{x} - 5x^4 + 2\sqrt{x}\right) dx$
9. $\int_{e}^{e^2} \ln x\ dx$
10. $\int_{4}^{5} x\sqrt{x^2 - 16}\, dx$
11. $\int_{0}^{2\pi} x \cos x\ dx$
12. $\int_{0}^{3} x\sqrt{1+x}\ dx$
13. $\int_{3}^{8} \frac{x}{\sqrt{1+x}} dx$
14. $\int_{0}^{1} \frac{dx}{1+x^2}$
15. $\int_{1}^{4} \left(2x + \frac{3}{\sqrt{x}}\right) dx$