

Puzzle - integration by parts

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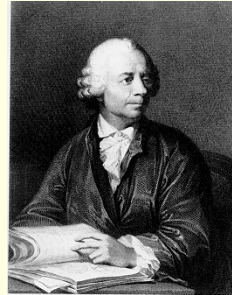
Instructions: Select a question clicking its checkbox. Solve the problem, write the answer and click Submit. No guessing! A maximum of 3 tries on any problem before you get 3 penalty points! Passing is to complete the puzzle with only 4 incorrect answers.

To the picture: Our **Mr. X** was born in Basel, Switzerland, on April 15, 1707 and died in St. Petersburg on September 18, 1783. He graduated from the University of Basel in 1724 where he studied theology and Hebrew.

Mr. X was extremely prolific – 886 books and papers, 13 children. His name is attached to formulas in every branch of classical mathematics. He contributed to every mathematical field that existed at the time and started many new fields.

He standardized modern mathematics notation when he used symbols such as $f(x)$, e , π , i and \sum in his textbooks. He was the first person to represent trigonometric values as ratios and prove that e is an irrational number. His invention of the calculus of variations led to the general method to solve max and min value problems.

Remarkably, much of his work dates from the the last two decades of his life, when he was totally blind. But he had always had an outstanding memory and could do enormous calculations in his head — so he prepared for the coming blindness by learning to write formulas on a slate and to dictate mathematics to a son or secretary.



1. $\int \ln x \, dx$

2. $\int \sqrt{x} \ln x \, dx$

3. $\int x \sin(x) \, dx$

4. $\int x \ln x \, dx$

5. $\int (x + 1) \ln x \, dx$

6. $\int x \sin(2x) \, dx$

7. $\int x^2 \ln x \, dx$

8. $\int (x - 2)e^x \, dx$