EXAM 1 - MATH 152 Friday, September 24

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Read each problem **very carefully** before starting to solve it. Each problem is worth 10 points. It is necessary to show **all** your work. Correct answers without explanations are worth 0 points. GOOD LUCK!!

1. Use integration by parts (twice) to compute the integral $\int (\ln x)^2 dx$.

2. Find the area enclosed by the ellipse $\frac{x^2}{4} + \frac{y^2}{16} = 1$. (Restrict attention to the first quadrant: solve for y and use the trigonometric substitution $x = 2\sin\theta$.)

3. Use partial fractions to compute the integral $\int \frac{10}{x^3-x^2+9x-9}dx$

4. Use the trapezoidal rule with $n = 4$ to estimate the integral $\int_0^{\frac{1}{2}} \sin(x^2)dx$. Then give an upper bound for the error of your estimate. (Recall $|E_T| \leq \frac{K(b-a)^3}{12n^2}$, where K is such that $|f''(x)| \leq K$, for all $a \leq x \leq b$.)

5. Determine whether the integral $\int_0^\infty xe^{-5x}dx$ is convergent or divergent. If it is convergent, find its value.