

Math 118 Winter 2015 Midterm Exam 1

FEB. 6, 2015 10AM - 10:50AM. TOTAL 20+2 PTS

NAME:

ID#:

- There are five questions.
- Please write clearly and show enough work.

Question 1. (5 pts) Calculate $\int \frac{x+2}{x^3+x} dx$.

Question 2. (5 pts) Calculate $\int \frac{\sin^3 x}{\cos^5 x} dx$.

Question 3. (5 pts) Calculate $\int_1^e \frac{\ln x}{x^2} dx$.

Question 4. (5 pts) Calculate $\int \frac{dx}{\sqrt{x^2 + 2x}}$.

Question 5. (Extra 2 pts) Let $f(x): \mathbb{R} \mapsto \mathbb{R}$ be differentiable with continuous non-vanishing $f'(x)$ and invertible with inverse function $g(x)$. Further assume that $f(x)$ is elementary. Prove: $\int f(x) dx$ is elementary if and only if $\int g(x) dx$ is elementary.

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