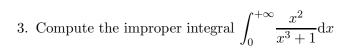# EXAM 4 - MATH 112

Friday, November 30

YOUR NAME:_____

George Voutsadakis

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. Compute the definite integral $\int_0^1 (e^{2x} + 1)^3 e^{2x} \mathrm{d}x$

2. Compute the indefinite integral $\int x^5 \ln x \, \mathrm{d}x$

3. Compute the improper integral $\displaystyle\int_0^{+\infty} \frac{x^2}{x^3+1}\,\mathrm{d}x$

4. Find the particular solution of the differential equation $\dfrac{\mathrm{d}y}{\mathrm{d}x} = x - 2xy$ under the initial condition $y(2) = 1$.

5. Find the particular solution of the differential equation $y' = \sqrt{y}e^x - \sqrt{y}$ under the initial condition $y(0) = 1$.