

MAT 126 Midterm

Name: _____

<i>Problem</i>	1	2	3	4	5	Total	Bonus
<i>Points</i>	30	30	20	10	10	100	15
<i>Scores</i>							

This midterm has five problems, weighted as shown. Please show your work – full credit may not be given if only the answers appear. **No calculators or books will be allowed on this test.** When calculating indefinite integrals, the answers should be in explicit forms, i.e. don't use part 1 of Fundamental Theorem of Calculus, unless otherwise stated.

1. Evaluate each of the following definite integrals.

(a) $\int_0^1 (x^3 + 1) dx$

(b) $\int_0^1 (x + 1)^3 dx$

(c) $\int_1^2 x^2 \ln x \, dx$

2. Calculate each of the following indefinite integrals.

(a) $\int x^3 e^{-x^2} dx$

(b) $\int \frac{3x + 4}{x^2 + x - 6} dx$

(c) $\int \cos^2 x \sin^2 x \, dx$

3. Calculate each of the following indefinite integrals.

(a) $\int \sin^3 x \, dx$

(b) $\int \frac{x^3}{\sqrt{1-x^2}} \, dx$

4. Express the following limit as a definite integral. Do not evaluate the definite integral.

$$\lim_{n \rightarrow \infty} \sum_{i=1}^n \frac{2}{n} \left(\sin \frac{2i}{n} \right)^3$$

5. Find the derivative of the following function.

$$f(x) = \int_{\ln x}^{e^x} \arctan t \, dt$$

6. (Bonus) Evaluate the following indefinite integral.

$$\int e^{\arcsin x} dx$$