Name: _____

Use of books, notes or calculators is **NOT** permitted.

Please show all your work! Answers without appropriate supporting work my not receive full credit.

Clearly indicate your answers to each problem by underlining them or placing a box around your answers!

Trigonometric functions at the values $0, \pi/6, \pi/4, \pi/3, \pi/2$, etc must be evaluated!

T/F Questions are graded with NO PARTIAL CREDIT.

Exam Score

Problem	Score	Out of:
1		10
2		20
3		10
4		25
5		15
6		20
Total		100

1. [**10**] For the True/False questions below, clearly circle your answer.

T or F If f and g are continuous on $[a, b]$, then $\int_a^b [f(x) + g(x)]dx = \int_a^b f(x)dx + \int_a^b g(x)dx$

T or F If f and g are continuous on $[a, b]$, then $\int_a^b [f(x)g(x)]dx = \int_a^b f(x)dx \cdot \int_a^b g(x)dx$

T or F If $p(x)$ is a polynomial function, then p has exactly one antiderivative whose graph contains the origin.

T or F If $\int_{-a}^{a} f(x)\,dx = 0$, then $f(x) = 0$ for all x in the interval $[-a, a]$.

T or F $\int_1^2 \frac{1}{x}\,dx = \ln|x||_{x=1}^{x=2} = \ln 2 - \ln 1 = \ln 2$.

2. [**20**] Find the function $f(t)$, if $f''(t) = 24t^2 + 6t + 10$, $f'(0) = -3$ and $f(-1) = 5$.

3. [**10**] Explain why $\int_{-\pi/2}^{\pi/2} \sin^5 x \cos^2 x\,dx$ is 0.

4. [**25**] Evaluate the integrals

   (a) [**6**] $\int xe^{x^2}\,dx$

   (b) [**6**] $\int_0^{\sqrt{\pi}} t\cos t^2\,dt$

   (c) [**6**] $\int \ln t\,dt$

   (d) [**7**] $\int_1^2 -\frac{\ln x}{x^2}\,dx$

5. [**15**] If

$$F(x) = \int_0^{x^3} \sin\left(t^2 + 1\right) dt$$

find $F'(x)$.

6. [**20**] Evaluate the integral

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