MATH 181 **MIDTERM 1** **FALL 1992**

Professor Libgober

NAME: (PRINT) ______________________________

SIGNATURE: ______________________________

SSN: ____________________ T.A.: ____________________

Find the following integrals:

1. $\int x^2 e^{-2x} dx$

2. $\int x \sin^2 x \; dx$

3. $\displaystyle\int_0^{\pi/4} \cos^5 2\theta \; d\theta.$

4. Write $\dfrac{(x+1)(x+2)}{(x-1)^3(x^2-4)(x^2+4x+5)^2}$ as sum of partial fractions with undetermined coefficients. Do not calculate the coefficients.

Calculate Integrals:

5. $\displaystyle\int \frac{dx}{(x^2+9)^2}$

6. $\displaystyle\int x^2\sqrt{1-x^2}\,dx$

7. $\displaystyle\int \sin^3 x \cos^8 x \; dx$

8. $\displaystyle\int_0^3 \frac{dx}{x^2 - x - 2}$

9. $\displaystyle\int \frac{dx}{x^3 - 2}$

10. Write down the approximation for $\displaystyle\int_0^1 \cos(x^2)dx$ using trapezoidal rule with 5 intervals. Estimate the error. According to trapezoidal rule

$$\int_a^b f(x)dx \cong \frac{\Delta x}{2} \left[f(x_1) + 2f(x_2) + \ldots + 2f(x_n) + f(x_{n+1})\right]$$

and $|E_n| \leq \dfrac{M(b-a)^3}{12n^2}$ when $M = \max|f''(x)|$ and $a \leq x \leq b$.