Exam 1
Chapter 5.3-5.5 and 8

Answer the following questions. *You must show your work to receive full credit.* Be sure to make reasonable simplifications. Indicate your final answer with a $\boxed{\text{box}}$.

1. (10 points) Evaluate the indefinite integral $\int e^x \cos x dx$.

2. (10 points) Evaluate the definite integral $\int_{-\pi/2}^{\pi/2} \sin^3 x \cos^3 x dx$.

3. (10 points) Find $\frac{dy}{dx}$, where

$$y = \int_1^x t^3 e^{t^2} dt.$$

4. (10 points) Find the area between the curve given by $y = \frac{1}{(4-x^2)^{3/2}}$ and the x-axis between $x = 0$ and $x = 1$.

5. (10 points) Evaluate the indefinite integral $\int \frac{x^2 dx}{(x-1)(x^2+2x+1)}$.

6. (10 points) Determine if the improper integral $\int_{-8}^{1} \frac{dx}{x^{1/3}}$ converges. If it does, evaluate the integral.