Calculus II : Test 1

Show your steps: you may not get any credit if the steps to the correct answer are missing. To ensure full credit, draw a box around the answer(s) to each problem. The exam is out of 20 points. Good luck!

Some formulas that you may find useful:
$\sin^2 x = (1 - \cos 2x)/2$
$\cos^2 x = (1 + \cos 2x)/2$
$\sin A \ \cos B = \frac{1}{2}[\sin(A - B) + \sin(A + B)]$
$\sin A \ \sin B = \frac{1}{2}[\cos(A - B) - \cos(A + B)]$
$\cos A \ \cos B = \frac{1}{2}[\cos(A - B) + \cos(A + B)]$
$\int \tan x \ dx = \ln|\sec x| + C$
$\int \sec x \ dx = \ln|\sec x + \tan x| + C$

1. (4 points) Evaluate $\int e^x x^2 dx$

2. (4 points) Evaluate $\int \sin^3 x \cos^2 x \ dx$

3. (2 points) Evaluate $\int \frac{\tan x}{\sec x} dx$

4. Write out the form of the partial fraction decomposition of the following (do NOT determine the values of the coefficients):

   (a) (2 points) $\frac{x}{x^2+2x+1}$

   (b) (1 point) $\frac{1}{x(x^2+1)}$

5. (3 points) Evaluate $\int \frac{x}{(x-1)(x-2)} dx$

6. (4 points) Evaluate $\int \sqrt{2x - x^2} \ dx$