Name_____   Student ID _____

_____ of 80 points

Show all work. Partial credit may be given for partially correct work. The point values are listed for each problem. Do not spend too much time on any one given problem.

Part I: Integration

Evaluate the following. (8 points each)

$$\int \frac{\ln x}{x^2}\,dx$$

$$\int \tan^3 x \sec x\,dx$$

$$\int x^2 \sqrt{4-x^2}\, dx$$

$$\int \frac{x-1}{x^2+3x+2}\, dx$$

$$\int \frac{3x^2 - 2}{x^2 - 2x - 8} \, dx$$

Part II: Short Answer (4 points each)

Set up but do not solve the following Partial Fraction Decomposition.

$$\frac{5}{x(x^2 - 1)(x^2 + 1)}$$

True or False (Circle One)

The following is a proper rational expression.

$$\frac{x^5 - 4x^3 + 5}{x(x^2 - 1)^2}$$

Integrate

$$\int \sec x \, dx$$

Integrate

$$\int \frac{1}{x^2 + 9} \, dx$$

Give the half angle identity and the Pythagorean identity for $\sin^2 x$.

Find x, dx, and draw the triangle for the following trig substitution problem. DO NOT SOLVE!

$$\int \frac{x^2}{\sqrt{9 - 25x^2}} \, dx$$

Integrate the following:

$$\int \frac{x}{\sqrt{x^2-9}}\,dx$$

Evaluate the following limits. Show all work on parts b and c (do not use shortcuts.)   (4 points each)

a. $\lim\limits_{x\to 0^+} \ln(x)$

b. $\lim\limits_{x\to\infty} \dfrac{2x^3+5x}{7x^3-9}$

c. $\lim\limits_{x\to\infty} \dfrac{3x^2}{e^x}$

___ of 16 points