Math 1620 Calculus II   Your Name:_____
Corning Community College
Instructor: Jay Hurlburt   **Exam 3 (Chapter 8)**
Directions: Please show all your work neatly and clearly. You will not receive full credit unless you show all work. Each problem is worth 5 points. Total =70 points.

Part I : Determine the following integrals.

1. $\int \cos^2 x \, \sin^3 x \, dx$

2. $\int \tan x \, \sec^6 x \, dx$

3. $\int \frac{x - 13}{x^2 - x - 6} dx$

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

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

6. $\int \dfrac{dx}{x^2\sqrt{9-x^2}}$

7. $\int (x+1)e^{3x}\ dx$

8. $\int x^2 \ln x\ dx$

Part II: In this part, *describe* the "algebraic" method you would use to evaluate the following integrals. You can set up the basic steps, but **do not evaluate the integral itself**.

9. $\int e^{3x} \cos(2x)dx$

10. $\int \dfrac{x^3}{\sqrt{x^2+4}}dx$

11. $\displaystyle\int \frac{4x^2 - 6x + 4}{(x^2 + 4)(x - 2)}\,dx$

Part III: Use L'Hôpital's rule to evaluate the following.

12. $\displaystyle\lim_{x \to \pi/2} \frac{1 - \sin x}{\cos x}$

13. $\displaystyle\lim_{x \to \infty} x^2 e^{-x}$

Part IV: Determine whether the following integrals converge or diverge. Use proper notation and show all work.

14. $\displaystyle\int_0^\infty e^{-2x}\,dx$

15. $\displaystyle\int_0^4 \frac{1}{(x - 2)^2}\,dx$