Kerry Ojakian's MTH 32 Class
Class Assignment #3

General Instructions:

- You may work in a group of **at most 3 students**.

- Hand in **one** assignment for your group; write each group member's full name on the assignment.

The Assignment
There are a list of integrals below. For every integral, indicate which method should be used (and justify this, but do **not** complete any integral):

1. *Basic formula*: If so state the basic formula (for example: $\int x^k \, dx = \frac{x^{k+1}}{k+1}$).

2. *Trig formula*: If so apply the trig identity to modify the integral appropriately; then stop!

3. *Substitution*: If so, just state the substitution (for example: just $u = 1 + x^2$), find du, and convert the integral to one with only u; then stop!

4. *Parts*: If so, just state what the u and dv are, find du and v, and apply the parts formula; then stop!

5. *Trig-substitution*: If so, state what the substitution is (for example: $x = 2\sin\theta$), find dx, convert the integral to one with only x, and apply a trig identity to simplify; then stop!

6. *Partial fractions*: If so, factor appropriately, and write the integrand as a sum of "variables over linear factors", doing synthetic division if necessary; then stop! (do **not** solve for the variables).

The Integrals

1. $\int \cos^3\theta \, \sin^7\theta \, d\theta$

2. $\int_0^1 \frac{1}{\sqrt{\theta}} \, d\theta$

3. $\displaystyle\int \frac{1+x^2}{(x-2)^2(x-3)}\, dx$

4. $\displaystyle\int (x)(3^x)\, dx$

5. $\displaystyle\int_0^{\pi/2} \cos^2(u)\, du$

6. $\displaystyle\int \frac{x^4}{x-1}\, dx$

7. $\displaystyle\int \frac{1}{\sec 3s}\ ds$

8. $\displaystyle\int_0^1 (y^2 + 1)(e^{-y})\ dy$

9. $\displaystyle\int \sin^5\theta\ \cos^4\theta\ d\theta$

10. $\displaystyle\int_0^1 w^3\sqrt{1 - w^2}\ dw$

11. $\displaystyle\int \frac{y}{\sqrt{y^2 - 7}}\, dy$

12. $\displaystyle\int \cos^2(u) \sin^2(u)\, du$

13. $\displaystyle\int \frac{x^2 + x + 6}{x^3 - 4x}\, dx$