Math 222 Quiz 3 (G)
344/346  Sep. 22, 2011

Instructions: You have 25 minutes to solve the following problems within groups. There are bonus problems on the back.

1. a). Find the area of the region bounded by \( y = \frac{x^2}{\sqrt{9-x^2}} \), \( x \)-axis and \( x = \frac{3}{2} \) (4 pts)
   
b). Find the volume of the solid generated by revolving the region bounded by
   \( y = \frac{x}{\sqrt{9-x^2}} \), \( x \)-axis and \( x = \frac{3}{2} \) about \( y \)-axis. (1 pt).
   Hint: You can make use of the integral in a).

2. Maybe, you want to use cover-up, or multiply the denominator and pick special x’s.
   a). \( \int \frac{x^2+4x+1}{(x-1)(x+1)(x+3)} \, dx \) (3 pts)
   b). \( \int \frac{x^3+4x^2+3x-2}{(x-1)(x+1)(x+3)} \, dx \) (2 pts). Hint: b) is closely related to a).
Bon

 differential equation system: \( x' = f(x) \) and \( y' = g(y) \).

 Let \( u = x - y \) and \( v = x + y \). Then the system becomes

 \[
 \begin{cases}
 x' = u + v \\
y' = u - v
\end{cases}
\]

Substitute \( u = x - y \) and \( v = x + y \) into the original system to get

 \[
 \begin{cases}
x' = A(x - y) + B(x + y) \\
y' = C(x - y) + D(x + y)
\end{cases}
\]

This system can be solved by standard techniques for linear differential equations.