Answer the problems on separate paper. You do not need to rewrite the problem statements on your answer sheets. Do your own work. Show all relevant steps which lead to your solutions. Attach this question sheet to the front of your answer sheets.

1. For each of the following functions find the derivative:
   
   a. \[ a(x) = -3x^2 + x - \frac{2}{x^4} \]  
   b. \[ b(x) = \frac{x^2 - 5}{x^2 + 2} \]  
   c. \[ c(x) = \cos^3(1 - 4x) \]  
   d. \[ d(x) = e^{2x} \tan x \]  
   e. \[ e(x) = (x + 3)e^{1-3x} \]  
   f. \[ f(x) = (x + 1)\ln(x + 1) \]  
   g. \[ g(x) = \sin^{-1}(1 - 2x) \]  
   h. \[ h(x) = x^2 - 2^x \]  

2. Find \( \frac{dy}{dx} \) by implicit differentiation: \( x^3 + 2xy + y^4 = x - 1 \)

3. For each of the following find the indefinite integral:
   
   a. \[ \int (4 - 3x^{1/2}) \, dx \]  
   b. \[ \int \frac{x^2 - x + 2}{x^3} \, dx \]  
   c. \[ \int \frac{5}{3(x^2 + 1)} \, dx \]  
   d. \[ \int x\sqrt{6 - x^2} \, dx \]  
   e. \[ \int \frac{\ln(x + 1)}{x + 1} \, dx \]