Name: ST. ID #:

1) Verify that the equation $y = \dfrac{1}{x} - \ln x$ is a solution of differential equation $x^2 y'' + xy' - y = \ln x$

2) Find a function $y = f(x)$ that satisfy the differential equation $y' = \cos 2x$ where $y(0) = 1$

3) Find the position function $x(t)$ of a moving particle given $a(t) = \dfrac{1}{\sqrt{t+4}}$ & $v_0 = -1$ & $x_0 = 1$

4) Find a general solution (implicit or explicit) of the differential equation $2y = \dfrac{dy}{dx}(1 - x^2)$

5) Find a particular solution of the differential equation $(x^2 + 1)y' - 3xy = x$, $y(0) = 1$

6) Explain what do we mean by a singular solution.