Phys 3010 Mathematical Physics
Assignment 6

The differential equations below are all directly integrate-able if you rearrange. Try solving by hand, then using Maple to check your work. (Maple uses the function dsolve for differential equations.)

1. Find the solution to the differential equation

$$\frac{dy}{dx} = y^{3/2}$$

given that y=4 when x=1.

2. Solve the differential equation $3(t^2+1)dx + x^2dt = 0$, given that $x = 2/\pi$ when $t = 1$.

3. Solve the differential equation

$$x^2 \frac{dy}{dx} = 6y$$

given that x=1 when y=1.

4. Solve the differential equation

$$\frac{d^2y}{dt^2} = 3\frac{dy}{dt}$$

given that y=4 at t=0 and dy/dt=1 at t=2. (Hint, first substitute v=dy/dt)

5. Solve the differential equation

$$\frac{dy}{dx} = xy + 4x - 2y - 8$$

given that y = -4 when x = 4.