

## DUE: 24 March 2011

Please answer these questions on a separate piece of paper.  
To receive full credit, you must show your work!!!

1. Find the general solution of the equation specified using integrating factors

(i)  $\frac{dy}{dt} = -\frac{y}{t} + 2$

(iv)  $\frac{dy}{dt} = -2ty + 4e^{-t^2}$

(ii)  $\frac{dy}{dt} = \frac{3}{t}y + t^5$

(v)  $\frac{dy}{dt} - \frac{2t}{1+t^2}y = 3$

(iii)  $\frac{dy}{dt} = -\frac{y}{1+t} + t^2$

(vi)  $\frac{dy}{dt} - \frac{2}{t}y = t^3e^t$

2. Solve the given initial-value problem

(i)  $\frac{dy}{dt} = -\frac{y}{1+t} + 2; \quad y(0) = 3$

(ii)  $\frac{dy}{dt} = \frac{1}{t+1}y + 4t^2 + 4t; \quad y(1) = 10$

(iii)  $\frac{dy}{dt} = -\frac{y}{t} + 2; \quad y(1) = 3$

(iv)  $\frac{dy}{dt} = -2ty + 4e^{-t^2}; \quad y(0) = 3$

(v)  $\frac{dy}{dt} - \frac{2y}{t} = 2t^2; \quad y(-2) = 4$

(vi)  $\frac{dy}{dt} - \frac{3}{t}y = 2t^2e^{2t}; \quad y(1) = 0$