Math 404 Homework Assignment # 1

Due: Feb. 8

1. Text, pg 5, # 2, 3

2. Find the general solution on $\mathbb{R}$ to

a) $t\frac{dy}{dt} + 4y = t^2$

b) $3\frac{d^2y}{dt^2} - 5\frac{dy}{dt} - 2y = 0$

3. Find the unique solution to

a) $\frac{d^2y}{dt^2} + 4\frac{dy}{dt} = 2 \quad , \; t > 0$

$y(0) = 0 \; , \; \frac{dy}{dt}(0) = 4$

b) $t\frac{d^2y}{dt^2} + \frac{dy}{dt} = -1 \qquad t > 1$

$y(1) = 0 \; , \; \frac{dy}{dt}(1) = 0$

4. What is the steady state solution to

a) $y(t) = 5 + 3e^{-t} + e^{-3t}$

(a solution to $\frac{d^2y}{dt^2} + 4\frac{dy}{dt} + 3y = 15$)

b) $y(t) = 4 + e^{-t} + 3te^{-t}$

(a solution to $\frac{d^2y}{dt^2} + 2\frac{dy}{dt} + y = 4$)