

**M340 sec 4 Assignment #3 due wed**

Solve the following differential equations. Use each of the following methods at least once:

- integrating factor
- variation of parameters
- undetermined coefficients

1.  $\frac{dy}{dt} + \frac{1}{t(t-1)}y(t) = t$

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

3.  $\cos t \frac{dy}{dt} - \sin t y(t) = \cos 4t$

4.  $\frac{dy}{dt} + 12 y(t) = \cos 4t$

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

6.  $\frac{dy}{dt} + 12 y(t) = \begin{cases} t & \text{if } 0 < t < 1 \\ 2-t & \text{if } 1 < t < 2 \\ 0 & \text{if } 2 < t \end{cases} \quad y(0) = 2$

7.  $\frac{dy}{dt} + 2 y(t) = 4e^{-2t}$

8.  $\frac{dy}{dt} + 12 y(t) = 2e^{2t} - 4e^{-4t}$