Math 2080: Differential Equations Worksheet 2.5: Linear differential equations

NAME:

- 1. For each of the first-order differential equations, decide whether it is linear or nonlinear. If the equation is linear, state whether it is homogeneous or inhomogeneous.
 - (a) y' = ky
 - (b) y' = k(72 y)
 - (c) y' = y(4-y)
 - (d) $y' = e^y$
 - (e) $3y' + 5y = 3\cos 2t$
 - $(f) 3y' + 5y = 3\cos 2y$
 - $(g) y' = 4t^2y \sin t$
 - $(h) y' = 4ty^2 \sin t$
- 2. Find the general solution to $y' 2y = 5e^{3t}$ by first solving (in your head) the related homogeneous equation, and then looking for a particular solution of the form $y_p(t) = ae^{3t}$.

3. Find the general solution to y' - 2y = t by first solving the related homogeneous equation, and then looking for a particular solution of the form $y_p(t) = at + b$.