Suggested problems 5

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1. Classify the following differential equations (order, determine if it is linear or non-linear).

   a) $y^{(4)} - y'' + y^2 = t^2 - 1$

   b) $y'' + y' + y = e^t$

   c) $y' - e^y = 1$

   d) $y^{(3)} - \frac{y'}{y} + e^{3t} = 0$

   e) $t \cdot y'' - \sin t \cdot y' + \log t = 0$

2. Find the solution of the given differential equations using the integrating factor method

   (a) $y' = 2x + y$;

   (b) $y' + 2y = t \cdot e^{-t}$.