Read each problem **very carefully** before starting to solve it. Each problem is worth 5 points. It is necessary to show **all** your work. Correct answers without explanations are worth 0 points. GOOD LUCK!!

1. Solve the first-order linear differential equation

$$y' - y = 2te^{2t}, \quad y(0) = 1.$$

2. Solve the first-order linear differential equation

$$ty' + 2y = t^2 - t + 1, \quad y(1) = \frac{1}{2}, \quad t > 0.$$