Supplementary problems: Sec. 3.4 # 8, 12, 16, 18, 20; Sec. 3.5 # 8, 12, 22

Compulsory problems:

(1) **[15 pts]** Use undetermined coefficients to solve the following IVP
\[ y'' + y = t(1 + \sin t); \quad y(0) = y'(0) = 0. \]

(2) **[15 pts]** Suppose \( y_1 = x^2 \) and \( y_2 = x^2 \ln x \) are solutions to the following ODE
\[ x^2 y'' - 3xy' + 4y = 0; \quad x > 0 \]
Identify the particular solution and then solve the IVP of
\[ x^2 y'' - 3xy' + 4y = x^2 \ln x; \quad x > 0; \quad y(1) = y'(1) = 0. \]

Your homework raw score is: \[ \frac{n}{2m} \cdot M + \left(1 - \frac{n}{2m}\right) \cdot N = N + \frac{n}{2m} (M - N). \]