ODE

Practice problems 07

1. Find the recurrence equation for the power series solution around $x = 0$ for the DE $y'' - -xy' + 2y = 0$.
2. Determine if $x = 0$ is an ordinary point of the DE $2x^2y'' + 7x(x + 1)y' - 3y = 0$.
3. Find the recurrence equation for the power series solution around $t = 0$ for the differential equation $\frac{d^2y}{dt^2} + (t - 1)\frac{dy}{dt} + (2t - 3)y = 0$.
4. Find the general solution near $t = 0$ of the DE given in problem 3.
5. Find the general power series solution around $x = 0$ of the DE $(x^2 + 4)y'' + xy = x + 2$.
6. Find the general power series solution around $x = 0$ of the DE $\frac{d^2y}{dt^2} + ty = e^{t+1}$.
7. Find the general power series solution near $x = 2$ of the DE $y'' - (x - 2)y' + 2y = 0$.
8. Find the general power series solution near $x = -1$ of the DE $y'' + xy' + (2x - 1)y = 0$.
9. Using the method of series solution, solve DE $y'' + xy' + (2x - 1)y = 0$ subject to the conditions $y(-1) = 2$ and $y'(-1) = -2$.
10. Solve the same problem given in #9 using the Taylor series method.