Homogeneous ODEs with Constant Coefficients [1]

Try the following in MATLAB:

```
syms m
eqn1 = 'm^2 - 3*m-1 = 0'
eqn2 = 'm^4 - 4*m^3 + 14*m^2 - 20*m + 25 = 0'
solve(eqn1)
solve(eqn2)
```

For each of the following differential equations:

- Write down the auxiliary equation.
- Write down, in standard mathematical notation, all of the solutions to the auxiliary equation. (Use MATLAB to find the solutions.)
- Write down the general solution of the differential equation.

(a) $y''' + y'' - 6y' - 18y = 0$

(b) $y^{(4)} - 2y''' - 6y'' + 16y' - 8y = 0$

(c) $y^{(4)} - 3y''' + 7y'' + 21y' - 26y = 0$

(d) $y^{(5)} - 2y^{(4)} + 2y''' - 4y'' + y' - 2y = 0$

(e) $2y^{(5)} - y^{(4)} - 4y''' + 3y'' - 8y' - 12y = 0$