

**Instructions:** Show all work. Answers without work required to obtain the solution will not receive full credit. Some questions may contain multiple parts: be sure to answer all of them. Give exact answers unless specifically asked to estimate.

1. Use reduction of order to solve  $t^2y'' - t(t+2)y' + (t+2)y = 0, y_1 = t$ .

2. Solve the homogeneous higher order equation  $t^3y''' - 3ty' + y = 0$ .