

Show all work. Your answers must be fully justified.

1. Find the general solution to the differential equation.

(a) $y'' + y' + 3y = 0$

(b) $y'' - 2y' - 15y = 0$

2. Consider the differential equation

$$t^2 y'' - t(t+2)y' + (t+2)y = 0$$

Use the fact that $y_1(t) = t$ is a solution to this equation and the method of Reduction of Order to find a second linearly independent solution of the form $y_2(t) = v(t) \cdot y_1(t)$.