Name:

1. Solve the following initial value problem.

$$\begin{aligned} 2y'' - 2y' + y &= 0 \\ y(0) &= 1 \\ y'(0) &= -1 \end{aligned}$$

2. Let $p_1(t)$, $p_2(t)$, and $p_3(t)$ be functions which are continuous on the interval $(0, \pi)$, and let

$$f(t) = t^3 - 3t^2 + 3t - 1.$$

Prove that f cannot be a solution of the differential equation

$$y''' + p_1(t)y'' + p_2(t)y' + p_3(t)y = 0. \tag{1}$$