Name:

KFUPM ID:

Exercise 1

Consider the differential equation

$$(x-1)y'' + 2y' = 0. \tag{1}$$

(1) Find two linearly independent power series solutions around $x_0 = 0$ of (1).
(2) Find the general solution of the DE (1).

Exercise 2

Consider the differential equation

$$xy'' + y' + xy = 0. \tag{2}$$

(1) Show that $x_0 = 0$ is a regular singular point of the DE (2).
(2) Find the Frobenius solution with the indical root $r = 0$.