Exercise 1 (8 points)

Solve the Boundary value problem: \( y'' - 2y' + 2y = 0, \) \( y(0) = 1, \) \( y\left(\frac{\pi}{2}\right) = 1, \)

if \( y(x) = c_1 e^x \cos x + c_2 e^x \sin x \)

Exercise 2 (12 points)

Use reduction of order to find a second solution \( y_2(x) \) of the differential equation: \( 4x^2 y'' + y = 0 \) if

\( y_1(x) = \sqrt{x} \ln x \)
Exercise 1 (8 points)
Solve the initial value problem: \( x^2 y'' - xy' + y = 0 \), \( y(1) = 5 \), \( y'(1) = -8 \),
if \( y(x) = c_1 x + c_2 x \ln x \)

Exercise 2 (12 points)
Use reduction of order to find a second solution \( y_2(x) \) of the differential equation: \( x^2 y'' - 3xy' + 5y = 0 \) if \( y_1(x) = x^2 \cos(\ln x) \)