Solve the initial value problem

\[ t^2 y'' - 4ty' + 4y = 0; \quad y(1) = -2, \quad y'(1) = -11. \]

SOLUTION: The auxiliary equation is \( r^2 + (-4 - 1)r + 4 = 0 \) has the roots \( r_1 = 1 \) and \( r_2 = 4 \). Thus, \( y = c_1 t + c_2 t^4 \). The initial conditions give the system:

\[-2 = c_1 + c_2 \]
\[-11 = c_1 + 4c_2.\]

Subtract the second equation from the first to obtain \( 9 = -3c_2 \). Thus, \( c_2 = -3 \). Then \( c_1 = -2 + 3 = 1 \).

Answer: \( y = t - 3t^4 \).