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:

\[
\begin{align*}
-2 &= c_1 + c_2 \\
11 &= c_1 + 4c_2.
\end{align*}
\]

Subtract the second equation from the first to obtain \(-13 = -3c_2\). Thus, \( c_2 = 13/3 \). Then \( c_1 = -2 - 13/3 = -19/3 \).

Answer: \( y = \frac{13}{3} t^4 - \frac{19}{3} t \).