Cypress College Math Review:

Cauchy-Euler Homogeneous and Nonhomogeneous Equations

Equations of the type $x^3y'''-x^2y''-2xy'-4y=0$ are called Cauchy-Euler or Equidimensional equations.

Make the substitution $x=e^t$ *and* $Y(t)=y\left(e^t\right)$

Replace	with
y	Y
xy'	D(Y)
x^2y''	D(D-1)(Y)
x^3y'''	D(D-1)(D-2)(Y)

Example) $x^3y'''-x^2y''-2xy'-4y=0,\ x>0$

Example) $x^2 y'' - 6y = 6x^4,\ x > 0$