Reduction of Order

1) Use reduction of order to find a second solution.

$$t^2\,y'' - 4\,t\,y' + 6\,y = 0, \quad y_1 = t^2$$

$$(x-1)\,y'' - x\,y' + y = 0, \quad y_1 = e^x$$

2) Use reduction of order for

$$(2-t)\;y''' + (2t-3)y'' - t\,y' + y = 0, \quad y_1 = e^t$$

In this example, if you do your algebra right, you will find an equation for v which you can solve. Once you have done this, you can solve the equation above completely.