Mathematical Methods of Physics I
Homework 3
due: Wednesday September 27

• Problem 1 [25 pts]
  Note that $y = x$ is a solution of
  \[(1 - x)y'' + xy' - y = (1 - x)^3, \tag{1}\]
  if the right hand side was zero. Use this fact to obtain the general solution of the given ODE.

• Problem 2 [25 pts]
  Solve
  \[x(1 - x)y'' + 4y' + 2y = 0. \tag{2}\]

• Problem 3 [25 pts]
  Solve
  \[x^2y'' + 3xy' + y = 16x^3. \tag{3}\]

• Problem 4 [25 pts]
  Solve
  \[x^2y'' - 2y = x^2 \tag{4}\]