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B. E. Sem-3 (ALL BRANCHES) (AEM- 2130002) 2017-18  
**Tutorial -4**

1. Verify that  $y = Ax^{-3/2} + Bx^{-1/2}$  is a solution of  $4x^2y'' - 3y = 0$  where A and B are constants.
2. If  $y = x$  is one solution of  $x^2y'' + xy' - y = 0$ , find general solution using method of reduction of order.
3. Find a second solution by reduction of order. If  $y'' - \frac{3}{x}y' + \frac{4}{x^2}y = 0$  for  $x > 0, y_1(x) = x^2$
4. Solve following I.V.P
  1.  $x^2y'' - 5xy' + 8y = 0, y(1) = 5, y'(1) = 18$
  2.  $(x^2D^2 - 3xD + 4)y = 0, y(1) = 0, y'(1) = 3$
5. Solve following differential equations
  1.  $(D^2 - 8D + 9)y = 40 \sin 5x$
  2.  $(D^2 - 4D + 3)y = \sin 3x \cos 2x$
  3.  $(D^4 + 2D^2 + 1)y = \cos x$
  4.  $(D^4 - 2D^2 + 1)y = \cos x + e^{2x} + e^x$
  5.  $(D^3 - D^2 - 6D)y = x^2 + 1$
  6.  $(D^2 - 3D + 2)y = 2e^x \cos\left(\frac{x}{2}\right)$
  7.  $x^2y'' - xy' + 2y = x \log x$
  8.  $x^3y''' + 2x^2y'' + 2y = 10\left(x + \frac{1}{x}\right)$
  9.  $x^2y'' - 4xy' + 6y = 21x^{-4}$
  10.  $x^3y''' - 3x^2y'' + 6xy' - 6y = x^4 \log x$
6. Solve following differential equations
  1.  $(1+x)^2y'' + (1+x)y' + y = 4 \cos \log(1+x)$
  2.  $(3+2x)^2y'' - 2(3+2x)y' - 12y = 6x$