

1. Find the general solution  $y_h$  for each of the following.

a)  $y'' + 3y' - 18y = 0$

b)  $9y'' + 6y' + y = 0$

c)  $y'' - 4y' + 5y = 0$

d)  $y'' + y' - y = 0$

2. Consider the problem (**see more homework problems**)

$$x^2y'' - x(x+2)y' + (x+2)y = 0$$

a) Show that  $y = x$  is one solution.

b) Find the second solution.

3. Solve the IVP using two methods. (**see more for sect. 3.4 and 3.5**)

$$y'' + 4y' = 36t^2 + 34t$$

$$y(0) = 0$$

$$y'(0) = 0$$

4. Consider the problem

$$y'' - cy' + y = 0$$

for some constant  $c$ . Describe how the behavior of this solution changes as  $c$  varies.