Linear Analysis II Exercise Set 5

1. Solve $x^2y'' + 5xy' + y = 0$.

2. Solve $x^2y'' + 5xy' + 6y = 0$.

3. Solve $4x^2y'' + y = 0$.

4. Solve $x^2y'' - 5xy' + 9y = 0$.

5. Solve $x^2y'' - 3xy' + 4y = x + 1$.

6. One solution to $y'' - xy' + y = 0$ is $y = x$. Find a second linearly independent solution. This second solution may involve an integral which cannot be evaluated, so the answer may involve an integral.