Series Solutions Near Regular Singular Points: $r_1 - r_2$ is an Integer-HW Problems

In problems 1-4 find all possible Frobenius solutions. If a Frobenius solution does not exist, show why it doesn't.

1. $x^2y'' + xy' + (x^2 - 4)y = 0$
2. $x^2y'' + (6x + x^2)y' + xy = 0$
3. $x^2y'' - xy' + y = 0$
4. $xy'' + (4 - x)y' - y = 0.$