

## EXTRA PROBLEMS FOR POWER SERIES SOLUTIONS TO DIFFERENTIAL EQUATIONS

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Find a power series solution to the following differential equations.

1. Solve  $y' = x^2y$  with initial conditions  $y(0) = 1$ .
2. Solve  $y' + (2x - 1)y = 0$  with initial conditions  $y(0) = 2$ .
3. Solve  $y'' = xy' + y$  with initial conditions  $y(0) = 1$  and  $y'(0) = 0$ .
4. Solve  $(x^2 + 1)y'' + xy' - y = 0$  with initial conditions  $y(0) = 1$  and  $y'(0) = 1$ .
5. Solve  $y'' + x^2y + xy = 0$  with initial conditions  $y(0) = 0$  and  $y'(0) = 1$ .
6. Solve  $y'' + x^2y = 0$  with initial conditions  $y(0) = 1$  and  $y'(0) = 0$ .
7. Solve  $y'' = y$  with initial conditions  $y(0) = 1$  and  $y'(0) = -1$ .
8. Solve  $x^2y'' + xy' + x^2y = 0$  with initial conditions  $y(0) = 1$  and  $y'(0) = 0$ .