

1. Consider the initial value problem $y' = x^2y - xy^2$, $y(2) = 3$.

(a) Evaluate $y'(2)$.

(b) Is the solution increasing or decreasing near $x = 2$?

(c) Evaluate $y''(2)$.

(d) Is the solution concave upward
or concave downward near $x = 2$?

(e) Are the Euler tangent line approximations of the solution near $x = 2$
greater than or less than the values of the solution?

2. Find the first three nonzero terms of the Maclaurin series of the solution of the initial value problem $y' = xy$, $y(0) = 1$.

3. Find the first four nonzero terms of the Maclaurin series of the solution of the initial value problem $y'' - 2y' + y = 0$, $y(0) = 0$, $y'(0) = 1$.

4. Find the first four nonzero terms of the Taylor series about $c = 1$ of the solution of the initial value problem $y' = y^2$, $y(1) = 1$.