

1. Consider the initial value problem

$$y'(x) = xy^3$$

$$y(0) = x_0.$$

- a) Find the solutions of this IVP for $x_0 = 0$, $x_0 = 1/2$, $x_0 = 1$, and $x_0 = 2$.
- b) What is the interval of existence of each of the solutions you found in part a)? Your answer must be exact, but you may find it helpful to use df when thinking about this problem.