

Ask! Indicate your approach! Show your work! Good Luck! There are 8 problems, 5 pages, and 100 points.

(1) [15] Find the equation for the orthogonal trajectories: $4x^2 + y^2 = c$.

(2) [10] Find the general solution of $y' = -4y^2$.

(3) [15] Sketch the slope field for the DE $y' = y(3 - y)$ and an approximate solution curve for the IVP $y' = y(3 - y)$, $y(0) = 1$.

(4) [10] Solve the IVP from problem 3.

Scratch Page Be sure to **CLEARLY** link work here to a problem! Put the link **THERE** too!

(5) [10] Find the general solution of $y' + 3xy = x^4$.

(6) [15] Find all p such that x^p is a solution of $x^2y'' + 3xy' - 9y = 0$ for $x > 0$, and find the general solution. Why is your solution the general solution?

(7) [15] Find a particular solution of $y'' - y = 10e^x \sin x$.

(8) [10] Find the general solution of $y'' - 2y' - 3y = e^{2x}$.