

MAT131 Fall 2022 Paper HW 8

Due the week of October 24 – October 28. For all problem sets, students are allowed to work together. However, the final answer you turn in must be based on your own understanding and must be in your words. Per university policy, all instances of suspected academic dishonesty will be referred to the academic judiciary.

Problem 1. Sketch the graph of the curve $y = x^2e^{-x^2}$ at all points where defined, including all of the following features: the y -intercept (if any), all x -intercepts (if any), all discontinuity points (if any), all vertical asymptotes (if any), all nondifferentiable points (if any), whether the function is even / odd (or neither), all horizontal asymptotes (if any), all critical points (if any), all local maxima (if any), all local minima (if any), all inflection points (if any), all intervals on which the function is increasing (if any), all intervals on which the function is decreasing (if any), all intervals on which the function is concave up (if any), all intervals on which the function is concave down (if any). You may use a graphing calculator or computer to check your work, but please show all work justifying your sketch using methods of calculus. In particular, leave all radicals in the coordinates of your special points unevaluated.

Problem 2. Repeat the exercise above with $y = e^{-x^2}/(x^2 - 1)$.