Your Name:_____ Signature:_____

TA Name:_____ Drill Time:_____

Quiz 3 (Takehome)

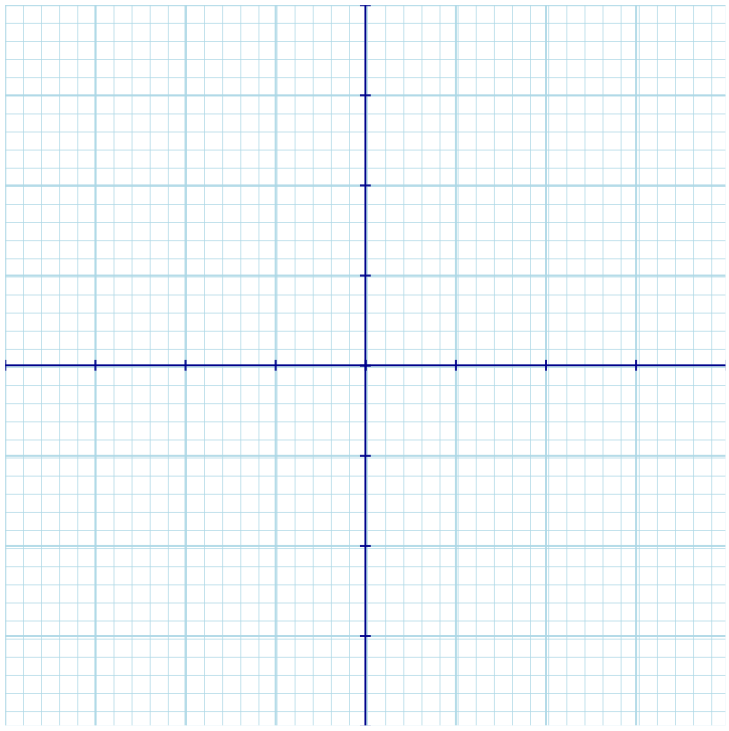
Math 2574: Calculus III

Due: In Drill on Tuesday, 2/18/20

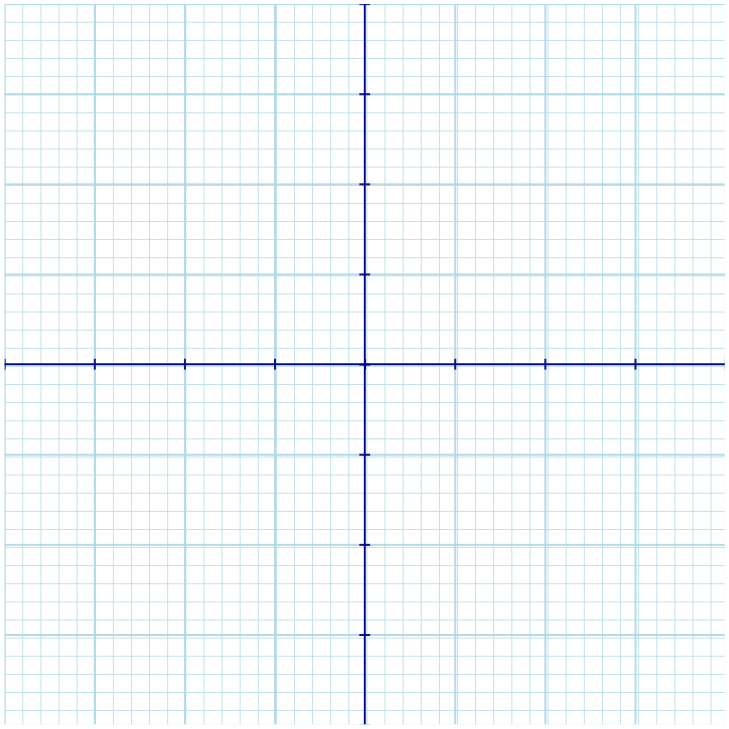
Write your final solutions NEATLY on the sheets of paper below. FIRST, work out your solutions on scratch paper, and THEN write up your solutions *nicely* in the space provided. When you are finished writing up a POLISHED version of your final solutions, staple these pages together and make sure your information is properly filled-in at the top of this page. This quiz will be graded on a 0-1-2 scale. A zero represents little progress, 1 represents average progress, and 2 represents excellent progress towards the final answer. Each of your answers must be properly justified with supporting work. Remember, the *process and techniques* for finding the right answer are typically more important than the answer itself. SO SHOW ALL YOUR WORK CLEARLY AND CONCISELY!

1. Find the length of the path defined by $\mathbf{r}(t) = \langle t^2, t^3 \rangle$ for $0 \leq t \leq 4$.

2. Graph and label several level curves for the function $f(x, y) = 2xy$ in the space below.



3. What is the domain of the function $g(x, y) = \ln(x - y)$? Sketch a region in the xy-plane.



4. Use the two-path test to show that the following limit does not exist:

$$\lim_{(x,y)\to(0,0)} \frac{4xy}{3x^2 + y^2}$$