Math 2080
Introduction to Analysis, Assignment 5
Due November 29th at the start of class.

Note that the due date is NOVEMBER 29th. This is two days later than the date given in the course schedule, because this assignment was 2 days late in getting posted to the course website. All questions are from Guaghan, 5th ed. All questions are proof questions, this means you will be marked on the clarity and logical correctness of your explanations. Poor writing and sloppy/illegible presentation both impact the clarity of your work and so will be penalized: you must write all solutions legibly and in complete sentences that follow a logical train of thought.

Questions from Chapter 2: 11, 14 (for question 14 it is not necessary to follow their suggestion of "guessing" using sequences), 20, 22, 24.

Questions from Chapter 3: 5.

Additional question: Define $f : \mathbb{R}^2 \to \mathbb{R}$ by

$$f(x, y) = \begin{cases} 0 & \text{if } (x, y) = (0, 0) \\ \frac{xy^2}{x^2 + y^4} & \text{otherwise.} \end{cases}$$

Show that f is not continuous at $(0,0)$. (Hint: Consider approaching $(0,0)$ along a path where every point (x_0, y_0) on the path, when plugged into $f(x, y)$, gives $f(x_0, y_0) = 1/2$. Show that this means it is not continuous).