Introduction to Analysis I (Fall 2025): Homework 6

- LSIRA stands for the textbook (Lindstrøm: Spaces An Introduction to Real Analysis).

- You **must email your submission as a PDF file** to kbala@wsu.edu. You are welcome to write answers by hand, and scan the writings.

- **If you use LATEX to typeset your homework submission, you will get 5 extra points!** You could use a LATEX locally on your computer or use a web service, e.g., Overleaf. Sorry, but using MS Word does not count here!

- Your file name should identify you in the following way. If you are Steamy Ray Vaughan, you should name your submission SteamyVaughan_Hw6.pdf (and **NOT** "Steamy Vaughan*" or **Sty**Vaughan* or Steamyvaughan*..., or Hw6_SteamyVaughan..., or ...). You are welcome to add anything more to your filename *after* these terms, e.g., SteamyVaughan_Hw6_Math401.pdf.
  Please avoid white spaces in the file name; TIA!

- **Begin the SUBJECT of your email submission with the same `FirstnameLastname`, e.g., "SteamyVaughan Hw6 submission".**

- The total points (given in parentheses) add up to 120.

- **This homework is due in my email inbox by 9:59 PM on Thursday, October 16**.

1. (25)   LSIRA Section 2.3 Problem 9 (Page 41).

2. (40)   Show that the equation $x^5 + 3x^3 - 2 = 0$ has exactly one real solution.

   Hint: Consider an appropriate function $f(x)$ and first show that it is continuous.
   You could use some of the standard results on continuity of functions we have
   seen *as is*, i.e., without proof. For instance, you could use the result that
   fg is continuous when f and g are.
   Then apply some of the results in LSIRA Section 2.3.

3. (30)   LSIRA Section 3.1 Problem 10 (Page 48).

4. (25)   LSIRA Section 3.1 Problem 12 (Page 48).