Math 3710 HOMEWORK #5 Name:

Due 9/29/2023, 8:30 a.m., before start of the class.

Solve the following problems and staple your solutions to this cover sheet.

1. See 1.4 #1(a, c)
2. See 1.4 #2
   Hint: Even though f is not defined at $x = 0$, you may fill in the hole in its graph by assuming $f(0) = 1$. Read the bottom part of page 66.
3. See 1.4 #3(a)
   Note: $\sinh x = \frac{e^x - e^{-x}}{2}$.
4. See 1.5 #3
5. See 1.5 #5
   Hint: Consider odd and even extensions of the function f. Determine what conditions f must satisfy in order for its extensions to satisfy hypotheses of Theorem 6 of section 1.5.
6. See 1.5 #8
7. Let f be an odd, periodic, piecewise smooth function with period $2a$ and Fourier coefficients b_n, $n = 1, 2, \cdots$. Show that $\sum_{n=1}^{\infty} b_n^2 = \frac{1}{a}\int_{-a}^{a} f^2(x)\,dx$.
   Hint: Apply theorem 4 of section 1.5. See class notes.
8. Free points!
9. Free points!
10. Free points!