Do any 7 of the following 10 exercises of your choice. Write up your solutions neatly in your own handwriting, and show all your work!

1. Compute the Fourier transform of \( f(x) = \begin{cases} 1 - x^2 & \text{if } |x| \leq 1 \\ 0 & \text{if } |x| > 1 \end{cases} \). Show your work.

2. Do problem 2 on page 224 of Folland.

3. Do problem 4 on page 224 of Folland.

4. Do problem 5 on page 224 of Folland.

5. Do problem 8 on page 224 of Folland. The gamma function is defined in appendix 3 on page 399 of Folland.


7. Do problem 14 on page 225 of Folland. Make sure to read the given hint!


10. Do problem 8 on page 235 of Folland.