

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.
6. Do problem 13 on page 225 of Folland.
7. Do problem 14 on page 225 of Folland. Make sure to read the given hint!
8. Do problem 6 on page 235 of Folland.
9. Do problem 7 on page 235 of Folland.
10. Do problem 8 on page 235 of Folland.