Any of the following exercises are fair game for appearing in a slightly altered state on an exam. I suggest that you write up your solutions **neatly** in your own handwriting, or .tex them up, so that you can easily use them for studying later. All solutions should be your own! Feel free to discuss solutions with others, but don't write anything down that you don't understand (and write it all yourself!). **Only a subset of the problems will be graded, so do them all to the best of your ability, and be aware: even if there is only one problem that you don't do well, it might be one that's graded! So, try to do them all well!**

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 $\Gamma : \mathbb{R}^+ \to \mathbb{R}$ is defined as
$$\Gamma(x) = \int_0^\infty t^{x-1}\mathbb{e}^{-t}\, dt.$$
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.