Math 557   Winter 2020   Homework 4   due: Tuesday, March 17

1. page 70 / 5 (steepest descent)   Assume n is even. What happens if n is odd?

2. page 78 / 1 (i) (stationary phase)   Find the leading order term in the expansion.

3. page 78 / 2 (Fresnel integral, stationary phase/steepest descent)

4. page 79 / 3 (a higher order point of stationary phase)

5. Let $f(x) = (x^4 + 1)^{-1/2}$. Find the first term in the asymptotic expansion of the Fourier transform $\widehat{f}(k)$ as $k \to \infty$. Use the definition $\widehat{f}(k) = \int_{-\infty}^{\infty} f(x)e^{ikx}dx$.

6. page 98 / 2 : inverse Fourier transform, use the definition $f(t) = \int_{-\infty}^{\infty} e^{itz}(z^2 - 1)^{-1}dz$