Physics 851 **Problem Set 3** **Fall 2022**

NOTE: All problem numbers from Sakurai correspond to the 3^{rd} Edition.

1. Sakurai 1.5

   [Hint: First show that $e^{\pm i\sigma_3\phi/2} = \cos(\phi/2) \pm i\sigma_z \sin(\phi/2)$ by expanding the exponential in a power series and then recollecting the terms.]

2. Sakurai 1.14

3. Sakurai 1.15

   [Hint: For Sakurai 1.14 and 1.15, you can use the answer to Sakurai 1.11 to obtain the relevant eigenvector.]

4. Sakurai 1.21

5. Sakurai 1.25