Homework Assignment #35
(due Nov. 18, 2020, 11pm, via gradescope)

1. Griffiths 7.13

2. Griffiths 7.17

3. Griffiths 7.22

   Hints:

   - For (a) use Eq. (5.41).

   - For (b) use Eq. (5.88) and to get the flux use that $\int \vec{B} \cdot d\vec{a}$ depends only on the boundary of the surface but not on the shape of the surface. The $\vec{B}$-field of a magnetic moment in the origin $\vec{m} = m\,\hat{\mathbf{z}}$ is given by Eq. (5.88), i.e. has spherical symmetry. To simplify $\vec{B} \cdot d\vec{a}$ choose therefore not a flat surface, but instead choose as surface a spherical cap centered around $\vec{m}$, that is a sphere with center where the small loop of radius a is, that is at $\vec{m}$, and choose as surface not the complete spherical surface but the boundary being the loop of radius b (see sketch at beginning of lecture on Nov. 16).

4. Griffiths 7.24