Homework Assignment #29

(due Oct. 31, 2020, 11pm, via gradescope)

1. Griffiths 5.23

   Hint: Please see sketch provided in class (course webpage see Lecture Notes for Oct. 28). In this sketch the wire is on the z-axis and the field point (observation point) is on the horizontal axis.

2. Griffiths 5.24

   Hint: First determine $\vec{A}$, then $\vec{B}$, and then $\vec{J}$.

3. Griffiths 5.26

   Hints: Assuming that the wire is along the z-axis, you can conclude from the symmetry, that $\vec{A} = A(s)\,\hat{\mathbf{z}}$.

   For (a) we know $\vec{B}$, so use $\nabla \times \mathbf{A} = \vec{B}$, and integrate to get $\vec{B}$.

   For (b) first use Ampère's law to get $\vec{B}$, then use the same approach as in (a). To determine the integration constants use $\vec{A}_{\text{inside}}(s = R) = \vec{A}_{\text{outside}}(s = R)$

4. (not required to be handed in) For next class, Oct. 30, add to the page of the summary triangles boundary conditions and the multipole expansion for electrostatics and for magnetostatics.