PHYS 3250 - Assignment #1

Instructor: Robin Kleiv (rkleiv@tru.ca)

Due date: 11:55 pm on Thursday September 17, 2020.

Instructions: Complete solutions are required for full marks. Submit your group's assignment using the dropbox on the PHYS 3250 Moodle page.

1. Consider the vector field $\vec{A} = s^2 \cos^2\phi \left(\hat{s} + \hat{\phi} + \hat{z}\right)$.

   (a) Verify the divergence theorem using this vector field. Take the volume $\mathcal{V}$ to be a cylinder of radius a and height H, whose bottom is centered at the origin, so the surface $\mathcal{S}$ is the surface of the cylinder.

   (b) Verify the curl theorem using this vector field. Take the open surface $\mathcal{S}$ to be the cylinder in part (a) with the bottom surface removed, so the boundary $\mathcal{C}$ is the perimeter of the bottom surface of the cylinder in part (a).