1. Let Φ be the surface consisting of $z = 3 - y^2$ above the xy-plane and the bounded portion of the xy-plane where $-2 \leq x \leq 2$ and $-\sqrt{3} \leq y \leq \sqrt{3}$.

   - Set-up (an) integral(s) that determines the flux of $-x\hat{\boldsymbol{x}} - y\hat{\boldsymbol{z}}$ through Φ.
   - Draw a picture depicting how one could employ the divergence theorem to compute the flux.
   - Carry out the calculation displayed by the picture.

2. Let S be the sphere of radius 2 inches.

   - Construct a surface integral that represents the flux of $-x\,\hat{\boldsymbol{x}} - y\,\hat{\boldsymbol{y}} - z\,\hat{\boldsymbol{z}}$ through S.
   - Construct a triple integral that is equivalent to the flux integral you constructed.
   - Which is easier to compute?

3. Consider the cylinder Σ defined by $y^2 + z^2 = 5$ and $2 \leq x \leq 5$ excluding the ends.

   - Construct a surface integral representing the flux of $x\,\hat{\boldsymbol{x}} - (y^2 + z^2)y\,\hat{\boldsymbol{y}} - (y^2 + z^2)z\,\hat{\boldsymbol{z}}$ through Σ.
   - Use the Divergence Theorem to convert the surface integral into a triple integral.
   - Use a diagram to indicate your method of applying the Divergence Theorem.
   - Compute one of the integrals you've constructed.