17.9a. Please do Problem 17 of §17.9 in Stewart’s Multivariable Calculus.

17.9b. Let \( \mathbf{r}(x, y, z) = (x, y, z) \). Compute the outward flux of \( \mathbf{F} = \mathbf{r}/|\mathbf{r}|^3 \) through the ellipsoid \( 4x^2 + 9y^2 + 6z^2 = 36 \). (Hint: Because \( \mathbf{F} \) is not continuous at zero, you cannot use the divergence theorem on the bounded region inside of \( S \). However, you may wish to consider the region bounded between \( S \) and the sphere of radius 100.)

17.9c. Suppose that \( E \) is the unit cube in the first octant and \( \mathbf{F}(x, y, z) = (-x, y, z) \). Let \( S \) be the surface obtained by taking the surface of \( E \) without it’s top (so \( S \) has five sides). Calculate \( \iint_S \mathbf{F} \cdot d\mathbf{S} \) directly and by using the divergence theorem.

17.9d. Use the divergence theorem to evaluate

\[
\iint_S (3x + 4y^2 + 2z) \, dS
\]

where \( S \) is the sphere of radius 2 centered at the origin.