1. Compute \( \int_C e^x \cos zdz + ydy - e^x \sin zdz \) where \( C \) is parameterized by 
\[ r(t) = \cos^3 \pi t \hat{i} + \sin^3 \pi t \hat{j} + \pi t^2 \hat{k} \] for \( 0 \leq t \leq 1/2 \).

2. Compute \( \int_C (y + e^x) dx + (2x^2 + \cos y) dy \) where \( C \) is the boundary of the triangle with vertices \((0, 0), (1, 1)\) and \((2, 0)\) oriented counterclockwise.

3. Use Stokes’s Theorem to compute \( \int_C \mathbf{F} \cdot d\mathbf{r} \) where 
\[ \mathbf{F}(x, y, z) = 2z \hat{i} + x \hat{j} + 3y \hat{k}; \] 
\( C \) is the ellipse in which the plane \( z = x \) meets the cylinder \( x^2 + y^2 = 4 \), oriented counterclockwise as viewed from above.

4. Let \( D \) be the solid region containing those points whose distance from the origin is between 1 and 2. Let \( \Sigma \) be the boundary surface of \( D \) with outward normal \( \mathbf{n} \). Let 
\[ \mathbf{F}(x, y, z) = (x^3 + 3xy^2) \hat{i} + (e^{xz} - x^2) \hat{j} + (z^3 + z^2) \hat{k} \] 
Evaluate 
\[ \int \int_{\Sigma} \mathbf{F} \cdot \mathbf{n} dS. \]