(1) Use Green’s theorem to evaluate $\oint_C xy^2 \, dx + 3\cos(y) \, dy$, where $C$ consists of the boundary of the region in the first quadrant that bounded by $y = x^2$ and $y = x^3$.

(2) Use Stokes’ theorem to compute the integral $\int \int_S \text{Curl} \mathbf{F} \cdot n \, dS$, where $\mathbf{F}(x, y, z) = <y, y - x, z^2>$ and $S$ is the sphere $x^2 + y^2 + (z - 4)^2 = 25$, $z \geq 0$.

(3) Use divergence theorem to find the outward flux $\int \int_S \mathbf{F} \cdot \mathbf{n} \, dS$ of the vector field $\mathbf{F}(x, y, z) = <y^2, x, z^3>$ and $D$ is the region bounded by $z = \sqrt{4 - x^2 - y^2}$, $x^2 + y^2 = 3$, $z = 0$. 