(1) Let \( \vec{F} = xy\vec{i} + xy\vec{j} + 3\vec{k} \) and consider the surface \( S : x^2 + y^2 + z^2 = 49 \). If \( D \) is the ball enclosed by \( S \), then which of the triple integrals below is equal to the surface integral \( \iint_S \vec{F} \cdot \vec{n} \, dS \)? Use the Divergence Theorem.

(a) \( \iiint_D (x + y^2 + xz) \, dV \)  
(b) \( \iiint_D (yz) \, dV \)  
(c) \( \iiint_D (y^2 + x) \, dV \)  
(d) \( \iiint_D (1 + x + 2y) \, dV \)  
(e) none of these  

(1) _____
(2) Let $\vec{F} = P\vec{i} + Q\vec{j} = (3 + 2x)\vec{i} + (7x + y)\vec{j}$.

Consider the line integral $\oint_C \vec{F} \cdot \vec{T} \, ds$ over a counter-clockwise oriented simple closed curve $C$ which bounds a region $R$ in the $xy$-plane.

If the area of the region $R$ in the $xy$-plane is 3, then by Green’s Theorem the value of $\oint_C \vec{F} \cdot \vec{T} \, ds$ is

(a) 9   (b) 3   (c) 7   (d) 21   (e) none of these    (2) _____