Name:_____

MVC Math 241-Lesson 12 Review

The aid of a calculator or computer is not permitted.

1) Explain the difference between the following calculations. A thorough answer will include exactly what each integral measures, and a discussion on what the differential of each integral means.

$\int_x f(x)\,dx$ $\qquad$ $\oint_P f(t)\,d\vec{P}$

$\iint_A f(x,y)\,dA$ $\qquad$ $\oiint_S f(t,s)\,d\vec{S}$

2) Evaluate the surface integral. $\iint_S 2y\ dS$, S is the part of the plane z = 1 + x + 5y that lies above the rectangle $-1 \le x \le 1$ and $0 \le y \le 4$ (In other words… calculate the integral with respect to the surface)

3) Find the area of the part of the plane z = x + y - 6 that sits directly above (or below) the unit disk in the xy-plane.

4) State the Divergence Theorem (Gauss' 3D Formula)

5) Measure the flow of the vector field Field[x, y, z] = $\{x, 2y, z\}$ across the sphere $x^2 + y^2 + z^2 = 9$. Then state whether the net flow of this vector field across the skin is from inside to outside, from outside to inside, or 0.

6) Find the area of the surface cut from the bottom of the paraboloid $x^2 + y^2 – z = 0$ by the plane $z = 4$.