Faculty of Arts and Sciences
Department of Mathematics
MATH152, Calculus II - Final Exam

05.01.2018

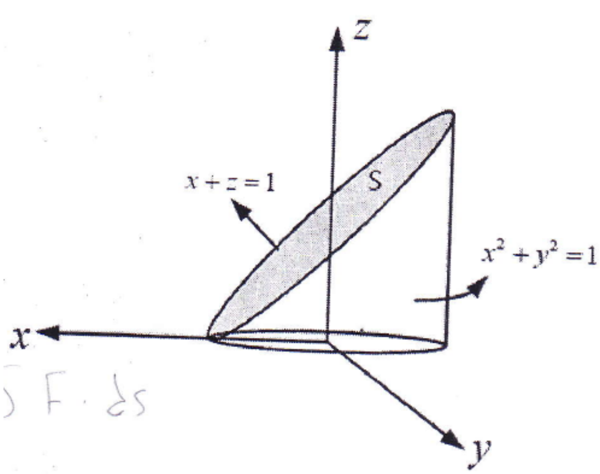
Q-1) Evaluate the line integral $\int_C xydx + yzdy + 3dz$ where C is the curve with parametric equation $x = t+1,\ y = 2t$ and $z = 1-t,\ 0 \le t \le 1.$

Q-2) a) Show that the line integral is independent of path $\oint_C (2x + y^2)dx + (5 + 2yx)dy$.

b) Evaluate the line integral $\oint_C (2x + y^2)dx + (5 + 2yx)dy$ where C is any curve from the point $A(1,1)$ and $B(2,4)$

Q-3) (10 points) Use Green's Theorem to evaluate the line integral $\oint_C (2yx)dx + (y^2 + 2x)dy$ where C is positively oriented boundary of the region bounded by $y = 2\sqrt{x}$, $x = 4$ and $x-$axis.

Q-4) (20 points) Evaluate the surface integral $\iint_S (x^2 + y^2)\ dS$ where S is the portion of the Plane $x + z = 1$ as shown in the figure by the shaded surface.



Q-5) Given $F(x,y,z) = 3y^2xi + 4z^2yj + zx^2k$. Then evaluate

a) (10 points) $curl\ F = \nabla \times F$

b) (10 points) $\text{div}F = \nabla \cdot F$

Q-6) (20 points) Use Divergence Theorem to evaluate the outward flux $\iint_S F \cdot \vec{n}\, dS$ of the vector field $F(x,y,z) = xy\ i + xz^2\ j + zx\ k$ where S is the surface of the first octant portion of the region Q bounded by $z = 9 - y^2$ and planes $x = 0$ and $x = 2$. (see the figure given below).