Binghamton University	Spring 2020
Math 323	Problem Set 16.8

2-6 Use Stokes' Theorem to evaluate $\iint_S \text{curl}(\mathbf{F}) \cdot d\mathbf{S}$.

3. $\mathbf{F}(x, y, z) = \langle ze^y, x\cos y, xz\sin y\rangle$, S is the hemisphere $x^2 + y^2 + z^2 = 16,\ y \geq 0$, oriented in the direction of the positive y-axis

5. $\mathbf{F}(x, y, z) = \langle xyz, xy, x^2yz\rangle$, S consists of the top and the fours sides (but not the bottom) of the cube with vertices $(\pm 1, \pm 1, \pm 1)$

7-10 Use Stokes' Theorem to evaluate $\int_c \mathbf{F} \cdot d\mathbf{r}$. In each case C is oriented counterclockwise as viewed from above.

7. $\mathbf{F}(x, y, z) = \langle x+y^2, y+z^2, z+x^2\rangle$, C is the triangle with vertices $(1, 0, 0),\ (0, 1, 0),\ (0, 0, 1)$

9. $\mathbf{F}(x, y, z) = \langle xy, yz, xz\rangle$, C is the boundary of the part of the paraboloid $z = 1 - x^2 - y^2$ in the first octant

13-15 Verify that Stokes' Theorem is true for the given vector field $\mathbf{F}$ and surface S.

13. $\mathbf{F}(x, y, z) = \langle -y, x, -2\rangle$, S is the cone $z^2 = x^2 + y^2,\ 0 \leq z \leq 4$, oriented downward

15. $\mathbf{F}(x, y, z) = \langle y, z, x\rangle$, S is the hemisphere $x^2+y^2+z^2 = 1,\ y \geq 0$, oriented in the direction of the positive y-axis

19. If S is a sphere and $\mathbf{F}$ satisfies the hypotheses of Stokes', show that $\iint_S \text{curl}\mathbf{F} \cdot d\mathbf{S} = 0$.