

Question 1

10 points

Let $\vec{f}(x, y, z) = (y^2z, y^3, xz)$, let $V \subseteq \mathbb{R}^3$ be given by $-1 \leq x \leq 1$, $-1 \leq y \leq 1$, $0 \leq z \leq 2$, and let $S = \partial V$ be the boundary of V . What is the value of the following surface integral? [Hint: use the divergence theorem.]

$$\iint_S \vec{f} \cdot \vec{n} \, dS$$

Answer 1.1: 2π Answer 1.2: 8 Answer 1.3: ∞ **Question 2**

5 points

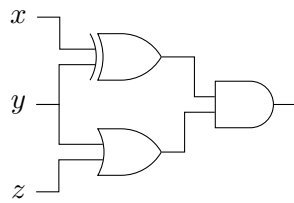
How many inversions are there in the list below?

3	2	1	6	6	10	5	12	11	8	8	15	9	13	14	16
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Answer 2.1: 15 Answer 2.2: 17 Answer 2.3: 19 Answer 2.4: 21 **Question 3**

7 points

For which of the inputs below does the following circuit produce an output of value 1? [One or more answers.]



Answer 3.1: $(x, y, z) = (1, 0, 1)$

Answer 3.2: $(x, y, z) = (0, 0, 0)$

Answer 3.3: $(x, y, z) = (0, 1, 0)$

Answer 3.4: $(x, y, z) = (1, 0, 0)$