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2.2 R1

1/1 point (graded)

A hypercube with side length 1 in d dimensions is defined to be the set of points (x_1, x_2, ..., x_d) such that $0 \leq x_j \leq 1$ for all j = 1, 2, ..., d. The boundary of the hypercube is defined to be the set of all points such that there exists a j for which $0 \leq x_j \leq .05$ or $.95 \leq x_j \leq 1$ (namely, the boundary is the set of all points that have at least one dimension in the most extreme 10% of possible values). What proportion of the points in a hypercube of dimension 50 are in the boundary? (hint: you may want to calculate the volume of the non-boundary region)

Please give your answer as a value between 0 and 1 with 3 significant digits. If you think the answer is 50.52%, you should say 0.505:

0.995 ✔ **Answer:** 0.995

0.995

Explanation

We know that the volume of the whole hypercube is $1^{50} = 1$. The volume of the interior of the hypercube is $0.9^{50} = 0.005$. Thus, the volume of the boundary is 1-0.005 = 0.995.

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Answers are displayed within the problem