

Time Limit: 5 minutes**Instructions:** Closed book. Closed notes. No calculator allowed.Instructions for all quizzes: **Do not discuss any aspect of this quiz with other midshipmen until after 6th period.**

Print your last name above. Also, fill in the bubble for your section.

Fill the bubble for the correct answer. Also, write your answers in any blanks provided.

Your work will not be graded unless the instructions request you show your work.

Throughout this quiz we consider the solid region

$$E = \{(x, y, z) \mid 0 \leq x \leq 2\pi, 0 \leq y \leq \pi, 0 \leq z \leq 3\}.$$

1. Evaluate the triple integral

$$\int \int \int_E 1 \, dV \quad \text{PUT YOUR WORK BELOW}$$

2π 6π $6\pi^2$ 3π none of above; correct is _____

$$\begin{aligned} \int \int_E 1 \, dV &= \int_0^{2\pi} \int_0^\pi \int_0^3 1 \, dz \, dy \, dx = \int_0^{2\pi} \int_0^\pi z \Big|_{z=0}^{z=3} \, dy \, dx = (3-0) \int_0^{2\pi} \int_0^\pi 1 \, dy \, dx \\ &= 3 \int_0^{2\pi} y \Big|_{y=0}^{y=\pi} \, dx = 3(\pi - 0) \int_0^{2\pi} 1 \, dx = 3\pi x \Big|_{x=0}^{x=2\pi} = 3\pi(2\pi - 0) = 6\pi^2. \end{aligned}$$

2. The solid region of integration E is best described as

sphere hemisphere cylinder half a cylinder rectangular box

Reason. The box is bounded by the parallel planes $x = 0$ and $x = 2\pi$; and the parallel planes $y = 0$ and $y = \pi$; and the parallel planes $z = 0$ and $z = 3$.