Math 261-001
Quiz 4, September 26

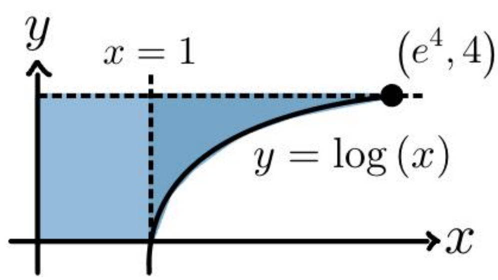
Name	CSU ID #

Be sure to read each question fully and carefully. Multiple choice answer bubbles must be fully filled in. There is space to the right of each multiple choice question to show work, if your work is correct you can get points even with an incorrect multiple choice answer. Each question is worth the same amount of points.

1. Consider the expression

$$I = \int_{x=0}^{x=1} \int_{y=0}^{y=4} \sqrt{1+e^{2y}} \mathrm{d}y \mathrm{d}x + \int_{x=1}^{x=e^4} \int_{y=\log(x)}^{y=4} \sqrt{1+e^{2y}} \mathrm{d}y \mathrm{d}x$$

The region described by this integral is shaded in the following figure:



Rewriting in the order $\mathrm{d}x\mathrm{d}y$ it is possible to express I as one integral:

$$\int_{\boxed{\mathbf{A}}}^{\boxed{\mathbf{B}}} \int_{\boxed{\mathbf{C}}}^{\boxed{\mathbf{D}}} \sqrt{1+e^{2y}} \mathrm{d}x \mathrm{d}y$$

Write the bounds of integration of the new integral in terms of y and x respectively, following the convention that $y = \cdots$ and $x = \cdots$

A:______________, **B**:______________, **C**:______________, **D**:______________.

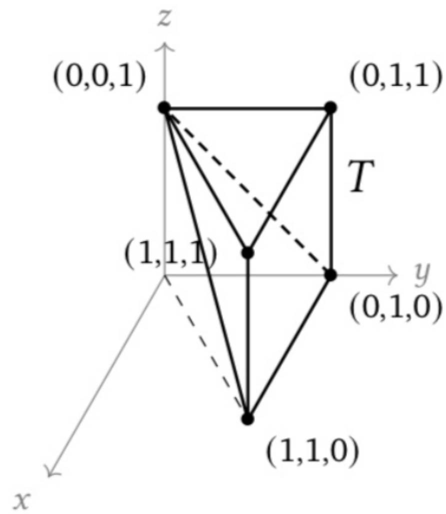
2. Suppose g is a differentiable function and consider the triple integral:

$$I = \int_{y=-1}^{y=1} \int_{x=0}^{x=\pi/2} \int_{z=0}^{z=\sqrt{\cos(x)}} z g'(y) \mathrm{d}z \mathrm{d}x \mathrm{d}y.$$

When calculating the integral, we obtain the value

- ◯ $I = 0$
- ◯ $I = 1$
- ◯ $I = 2(g'(1) - g'(0))$
- ◯ $I = \frac{g(1)-g(0)}{2}$
- ◯ $I = g(1) - g(0)$

3. Let T be the polyhedron with vertices $(0,1,0)$, $(1,1,0)$, $(1,1,1)$, $(0,1,1)$, and $(0,0,1)$.



The volume of T can be expressed by the following triple integral:

- ○ $\int_0^1 \int_0^x \int_{1-x}^1 \mathrm{d}z\mathrm{d}y\mathrm{d}x$
- ○ $\int_0^1 \int_{1-x}^1 \int_{1-x}^1 \mathrm{d}z\mathrm{d}y\mathrm{d}x$
- ○ $\int_0^1 \int_x^1 \int_{1-y}^1 \mathrm{d}z\mathrm{d}y\mathrm{d}x$
- ○ $\int_0^1 \int_{1-x}^1 \int_{1-y}^1 \mathrm{d}z\mathrm{d}y\mathrm{d}x$
- ○ None of the above

4. Compute the value of the following double integral

$$I = \int_{\mathrm{T}} e^{ax+by}\mathrm{d}A,$$

where T is the triangle bound by $x=0$, $y=0$ and $ax+by=1$.

- ○ $I = 1$
- ○ $I = a$
- ○ $I = b$
- ○ $I = ab$
- ○ $I = \frac{1}{ab}$