

Print Name: Key

Sign Name: \_\_\_\_\_

TARDIS CODE: 

--	--	--	--

Mathematics 5B Spring 2011: Lecture Quiz 5

May 20, 2011

Professor J. Douglas Moore

**Multiple Choice.** Circle the best answer to each of the following questions. Each question is worth 2 points.

1. If  $\mathbf{x} = (1, 0, 1)$  and  $\mathbf{y} = (0, 1, 1)$ , then the area of the parallelogram spanned by  $\mathbf{x}$  and  $\mathbf{y}$  is  $|\vec{x} \times \vec{y}| =$

- a. 1      **b.  $\sqrt{3}$**       c.  $2\sqrt{2}$       d. 3      e. None of these

2. If  $S$  is the cylinder parametrized by  $\mathbf{x} : D \rightarrow \mathbb{R}^3$ , where

$$D = \{(u, v) \in \mathbb{R}^2 : 0 < u < 1, 0 \leq v < 2\pi\} \text{ and } \mathbf{x}(u, v) = \begin{pmatrix} \cos v \\ \sin v \\ u \end{pmatrix}$$

then

$$\iint_S z \, dA = \iint_S z \, dS = \int_0^{2\pi} \int_0^1 u \, du \, dv$$

- a.  $(1/2)\pi$       **b.  $\pi$**       c.  $(3/2)\pi$       d.  $2\pi$       e. None of these

3. If  $\mathbf{F}(x, y, z) = (0, 0, 1)$  and  $S$  is the part of the paraboloid parametrized by  $\mathbf{x} : D \rightarrow \mathbb{R}^3$ , where

$$D = \{(u, v) \in \mathbb{R}^2 : u^2 + v^2 < 1\} \text{ and } \mathbf{x}(u, v) = \begin{pmatrix} u \\ v \\ u^2 + v^2 \end{pmatrix},$$

then when  $\mathbf{N}$  is the upward pointing unit normal,

$$\iint_S \mathbf{F} \cdot \mathbf{N} \, dA = \iint_S \mathbf{F} \cdot d\mathbf{S} = \iint_D \begin{pmatrix} 0 \\ 0 \\ 1 \end{pmatrix} \cdot \begin{pmatrix} -2u \\ -2v \\ 1 \end{pmatrix} \, du \, dv =$$

- a.  $(1/4)\pi$       b.  $(1/3)\pi$       c.  $(1/2)\pi$       **d.  $\pi$**       e. None of these