

Math 20E

August 8, 2013

Question 1 If $D \subseteq \mathbb{R}^2$ is enclosed by continuous curves $y = \phi_1(x)$ and $y = \phi_2(x)$ with $\phi_1(x) < y < \phi_2(x)$ for $a \leq x \leq b$, with $c = [\phi_1]_{\min}$ and $d = [\phi_2]_{\max}$, then

A. $\iint_D f(x, y) dA = \iint_R f^*(x, y) dA$, where the rectangle $R = [a, b] \times [c, d]$ and

$$f^*(x, y) = \begin{cases} f(x, y) & \text{if } (x, y) \in D \\ 0 & \text{otherwise} \end{cases}.$$

B. $\iint_D f(x, y) dA = \int_{x=a}^b \int_{y=\phi_1(x)}^{\phi_2(x)} f(x, y) dy dx.$

***C.** Both **A** and **B**

D. Neither **A** nor **B**

Question 2 If $D \subseteq \mathbb{R}^2$ is **y-simple**, then

***A.** $\iint_D f(x, y) dA = \int_{x=a}^b \int_{y=\phi_1(x)}^{\phi_2(x)} f(x, y) dy dx$ for some functions ϕ_1, ϕ_2 and constants a, b .

B. $\iint_D f(x, y) dA = \int_{y=c}^d \int_{x=\psi_1(y)}^{\psi_2(y)} f(x, y) dx dy$ for some functions ψ_1, ψ_2 and constants c, d .

C. Both **A** and **B**

D. Neither **A** nor **B**

Question 3 If $D \subseteq \mathbb{R}^2$ is **simple**, then

A. $\iint_D f(x, y) dA = \int_{x=a}^b \int_{y=\phi_1(x)}^{\phi_2(x)} f(x, y) dy dx$ for some functions ϕ_1, ϕ_2 and constants a, b .

B. $\iint_D f(x, y) dA = \int_{y=c}^d \int_{x=\psi_1(y)}^{\psi_2(y)} f(x, y) dx dy$ for some functions ψ_1, ψ_2 and constants c, d .

C. D is both x -simple and y -simple.

***D.** **A, B** and **C**

E. Neither **A, B** nor **C**