

Total score: 33 points March Boedihardjo © 2021

- Write your solutions on some papers. Scan as pdf/jpg file(s). Upload the **pdf/jpg** file(s) as CCLE Assignment Midterm 1 before the end time.
  - Open book. Calculators are not prohibited. But you cannot get any help from other people. Open internet. Except for online calculator, using any of the online forum or simply google something (and then find something useful and copy down to your answer) could easily lead to plagiarism.
  - Unless specified otherwise, you may compute any integral using Fundamental Theorem of Calculus without using the definition involving Riemann sum.
  - Show your work for computations of integrals. You may use calculators to check your final answers.
  - If your final answer is a number, have it in 6 decimal places or in fraction.
  - **\*\*Recommended:** After submission, logout and log in CCLE. See if your file is there; download the file you submitted and check if it is the file you intended to submit.\*\*  
Avoid the following: Upload wrong file or upload only the first page (unless it is intended to be only 1 page; in this case, it's ok).
1. (7 points) (i) Find the polar coordinates of the Cartesian coordinates  $(-4, 3)$   
 (ii) Find  $S_{3,2}$  for  $\int_{[0,1] \times [0,1]} xy^2 d(x, y)$  using upper-left vertices.  
 (iii) Find  $\int_D x + y d(x, y)$  where  $D = \{(x, y) | 0 \leq x \leq y, x^2 - y^2 \geq 1\}$ .  
 (iv) Find  $\int_{[0,2] \times [0,1]} x(x + y) d(x, y)$ .
  2. (8 points) Let  $D = \{(x, y) | x > 0, y > 0, x^2 + y^2 \leq 3y\}$ . Find  $\int_D x d(x, y)$   
 (i) using polar coordinates. You may use  $\int \sin^n \theta \cos \theta d\theta = \frac{1}{n+1} \sin^{n+1} \theta + \text{constant}$ .  
 (ii) using  $\int \int dx dy$  set up.
  3. (8 points) Let  $D = \{(x, y) | 0 \leq x \leq y \leq 4 - x\}$ . Find  $\int_D 1 d(x, y)$  using  
 (i)  $\int \int dy dx$  set up.  
 (ii)  $\int \int dx dy$  set up.
  4. (10 points) Use  $\int \int \int dz dy dx$  set up to find  $\int_W 1 d(x, y, z)$  where  
 (i)  $W = \{(x, y, z) | 0 \leq x \leq 1, y \geq 0, y \leq z \leq x\}$   
 (ii)  $W = \{(x, y, z) | 0 \leq x \leq y \leq 2, 1 \leq z \leq y\}$   
 Do NOT set up using  $\int \int \int dz dx dy$ .

End of exam