



UNIVERSITAS ISLAM INDONESIA
FAKULTAS MIPA
Jl. Kaliurang Km. 14,5 Jogjakarta

FINAL EXAM ACADEMIC YEAR 2019/2020

Course	: Calculus 2
Study Program/Class	: Statistics / A, B
Day/Date	: Kamis, 16 Juli 2020
Time	: 120 Menit
Lecture	: Abdullah Ahmad Dzikrullah, S.Si., M.Sc.
Exam Description	: Opened Book
Online Media	: Google Classroom

PLO : Mastering the concepts of probability theory and statistics, mathematics, calculus, elementary linear algebra, statistical analysis methods, and elementary computer programming

*CO : 1. Students are able to explain mathematical and calculus concepts and theories
2. Students are able to explain the steps of analysis in mathematics and calculus*

Indicator : Students are able to calculate finite integrals

1. **(Score 20)** Using the Riemann integral property, $\lim_{n \rightarrow \infty} \sum_{i=1}^n f(\bar{x}_i) \cdot Vx_i$. Prove That :

a. $\int_{-1}^1 (2 - 3x^2) dx = 2$

b. $\int_{-1}^1 (3x^2 + 1) dx = 4$

Indicator : Students are able to calculate improper integrals

2. **(Score 20)** Using the comparison test of two functions, determine the convergence of the

following improper integral: $\int_1^{\infty} \frac{1}{x \cdot e^x} dx$ Hint: compare with $\int_1^{\infty} \frac{1}{e^x} dx$

Indicator : Students are able to calculate the area of the Cartesian and polar coordinate planes

3. **(Score 30)** Calculate the area of the coordinate plane as follows::

a. Under the curve $y^2 = 4x$ and above the line $4x - 3y = 4$

b. Outside the circle $r = 2$ and inside cardioid $r = 2(1 + \cos \theta)$

Indicator : Students are able to calculate the volume of a rotating object

4. (Score 30) Given a region bounded by two parabolic functions, $y = x^2$ and $y = 4x - x^2$:
- Sketch the graphs of the two functions, then determine the point of intersection!
 - Calculate the volume if it goes around the line $x=2$
 - Calculate the volume if it goes around the line $y=4$

The verification of Final Exam, Odd Academic Year 2020/2021				
The suitability of the problems with CO	The Completeness of the problems information	Verifier	Verification date	Sign
Suitable/ Less suitable / Not Suitable	Complete/ Less Complete / Complete/Not Complete	Science cluster coordinator	10-July-2020	