2017

UNIVERSITEIT VAN JOHANNESBURG
UNIVERSITY OF JOHANNESBURG

UNIVERSITEIT VAN JOHANNESBURG

FAKULTEIT NATUURWETENSKAPPE
FACULTY OF SCIENCE

MAT1A3E
(Introduction to Calculus of One-Variable Functions)

SUPPLEMENTARY EXAMINATION

LECTURERS: Ms. D. Schubert

EXTERNAL EXAMINER: Mr. J. Homann

TIME: 2 HOURS

50

SURNAME AND INITIALS: .....

STUDENT NUMBER: .....

TEL NO: .....

Please read the following instructions carefully:

1. Answer all the questions in pen.
2. This paper consists of 1 cover page + 5 pages.
3. No calculator allowed.

1. Find :

i. $\int e^{4x}\cos 6x\, dx$ (5)

ii. $\int \frac{-5x+2}{(x-1)(x^2+3)}\, dx$ (6)

iii. $\int \sin^5 x \cos^2 x \, dx$ (5)

iv. $\int_{\sqrt{2}}^{2} \frac{2}{t^3\sqrt{t^2-1}} dt$ (6)

v. $\int \frac{7x^3}{x^4+2}\, dx$ (3)

vi. $\int \frac{\sin x - \cos x}{\cos x}\, dx$ (3)

v. $\int 3x\sqrt{x^2+5}\, dx$ (5)

2. i. State both parts of the Fundamental Theorem of Calculus. (4)

ii. Given $g(x) = \int_{\sqrt{x}}^{x^3} \sqrt{t} \sin t \, dt$, find $g'(x)$. (3)

iii. Find the area enclosed between the curves

$y = 12 - x^2$ and $y = x^2 - 13$. (6)

iv. Find the area enclosed between the curve $f(x) = 2x^2 - 3x - 5$ and the X-axis. (4)