



United International University
School of Science and Engineering
Final Examination Trimester: Fall 2019
Course Title: Fundamental Calculus (CSE)
Course Code: Math 1151 Marks: 40 Time: 2 hour

Answer all questions. Answer all the subparts of a question in one place.

1. (a) Evaluate the following integrals by any suitable methods: [10]

i) $\int \sin^{-1}(x) dx$

ii) $\int e^x \sin x dx$

iii) $\int \cos^3 x dx$

iv) $\int x\sqrt{x-1} dx$

2. (a) Show that $\int_0^{\sqrt{2}} \sqrt{2-x^2} dx = \frac{\pi}{2}$ by considering $x = \sqrt{2} \cos \theta$. [4]

(b) Evaluate: i) $\int t\sqrt{7t^2+12} dt$ ii) $\int \frac{\sin(\frac{5}{x})}{x^2} dx$ iii) $\int \frac{1}{\sqrt{1-4x^2}} dx$ [6]

3. (a) Find the area between two curves $y^2 = 4x$ and $y = 2x - 4$ by
i) integrating with respect to x , ii) integrating with respect to y . [5]

(b) In each part, evaluate the integral, given that $f(x) = \begin{cases} -x+1, & x > 0 \\ |x+1|, & x \leq 0 \end{cases}$ [5]

i) $\int_{-2}^2 f(x) dx$ ii) $\int_2^4 f(x) dx$

4. (a) Find $\frac{dy}{dx}$ of the following functions

i) $y = \sqrt{3 - \sqrt{2x}}$ ii) $y = \sqrt{x} \sec(2x - 2)$ iii) $y = \sin(\sin(2x))$ [6]

(b) Find the equation of tangent line to the curve $y = x \cos(x^2 + 2x)$ at $x = -\frac{\pi}{2}$. [4]