

Daffodil International University

Faculty of Science & Information Technology Department of Computer Science and Engineering Midterm Examination, Fall-2024

Course Code: MAT 102, Course Title: Mathematics II

Level: 01 Term: 02 Batch: 66

Time: 1.5 Hours

For more questions: https://diuqbank.com | Uploader: Gazi Hasnain Ahamed 241-15-190

Answer All Questions

[The figures in the right margin indicate the full marks and corresponding course outcomes. All portions of each question must be answered sequentially.]

Illustrate β - Γ function to calculate the exact value of $\int_0^1 \sqrt{x} (1-x^2)^3 dx$.	[3]	
Demonstrate the value of $\int_0^{\pi/2} \cos^3 \theta \sin^{\frac{5}{2}} \theta d\theta$.	[3]	COI
Show that $\int_0^\infty \sqrt{x} \ e^{-2x} \ dx = \frac{\sqrt{\pi}}{4\sqrt{2}}.$	[2]	
a) In a gaming simulation, the score S is modeled by the function $S(x, y) =$	[3]	
$\ln(x^2 + y^2) + e^x \cos(y)$, where x represents the number of enemies defeated and y represents the number of levels completed. Identify the value of S_x , S_y and S_{yx} .	L'I.	CO2
Apply Euler's theorem for the function $u = \sin^{-1}\left(\frac{x+2y+3z}{\sqrt{x^8+y^8+z^8}}\right)$ to show that	[4]	
$x\frac{\partial u}{\partial x} + y\frac{\partial u}{\partial y} + z\frac{\partial u}{\partial z} = -3\tan u.$	~ =	. /~
Evaluate $\iiint_V (x+z) dy dx dz$, where V is the region of space bounded by $x=0$, $x=z^2$, $y=x$, $y=z$, and $z=2$, $z=0$.	[5]	CO4
Two fluids in the complex plane are represented by the vectors $z_1 = 3 + 7i$ and $z_2 = -4 + 5i$.	[1+4]	
(i) Identify the resultant fluid. (ii) Construct the resultant fluid flow vector in both polar form and exponential form.		CO2

Surviva L, I, A, DE