

Course Code: ENGI 1302
Course Title: Calculus II
Due: 20-May-2019
No. of Questions: (4 Four)
Time: (2 Hours)
Calculator (*Yes, no advanced ones*)

UNIVERSITY OF PALESTINE



Final Exam
Grade 100/2
Second semester 2018/2019

Instructor Name: _____
Student Name: _____
Student No.: _____
Section No.: _____
College Name: Engineering
Using Dictionary (No)

QUESTION 1

Three Branches

(12 + 10 + 7 = 29 points)

(a) Given that $y = 3 - \frac{5}{2} \ln(x)$

1. Find the followings

I. Domain of $y =$

II. Range of $y =$

2. Find the inverse function $y^{-1}(x)$.

3. Find the domain and range of $y^{-1}(x)$

I. Domain of $y^{-1} =$

II. Range of $y^{-1} =$

4. Find $\left. \frac{d y^{-1}(x)}{d x} \right|_{f(x)=3}$

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(b) Given that

$y_1 = \pi^{2x}$	$y_2 = 2x^{(e^2)}$
$y_3 = \tanh(x^2 + 2)$	$y_4 = \ln(\cosh^{-1}(x))$

Evaluate the following derivatives

$\frac{d y_1}{d x} =$	$\frac{d y_2}{d x} =$
$\frac{d y_3}{d x} =$	$\frac{d y_4}{d x} =$

(c) Compute the following limit: $\lim_{x \rightarrow 0^+} x \int_x^1 \frac{\cos(t)}{t^2} dt$

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QUESTION 2

Two Branches

(10 + 8 = 18 points)

Evaluate the following *two* integrals

(a) $\int (1-x^2) e^{3x} dx$

(b) $\int_1^{\infty} \frac{1}{x + x\sqrt[3]{x}} dx$

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QUESTION 3

Two Branches

(10 + 8 = 18 points)

Test the following **two** improper integrals for convergence/divergence

(a)
$$\int_0^{\infty} \frac{1}{7^x + 1} dx$$

(b)
$$\int_0^1 \frac{\cos^2(x)}{x^3 + \sin(x)} dx$$

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QUESTION 4

Five Branches

(7 + 7 + 7 + 7 + 7 = 35 points)

Test the following **five** series for convergence/divergence, and find the sum when possible

1.
$$\sum_{n=2}^{\infty} \frac{1}{n(n-1)}$$

2.
$$\sum_{n=1}^{\infty} \frac{\sec^{-1}(n^2 + n)}{n^{2.3} + 600\sqrt{n}}$$

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3.
$$\sum_{n=1}^{\infty} \frac{3^n + 2^n}{6^n}$$

4.
$$\sum_{n=3}^{\infty} \frac{8}{n (\ln(n^2))^3}$$

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5.
$$\sum_{n=2}^{\infty} \frac{1}{(\ln n)^2}$$

End of Questions
Good Luck