

Course Code: ENGI 1302
 Course Title: Calculus II
 Due: April-2019
 No. of Questions: (4 FOUR)
 Time: (1Hour)
 Using Calculator (Yes)

UNIVERSITY OF PALESTINE



Second Exam
 Grade 30/2

Second semester 2018/2019

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

THINGS THAT MIGHT BE USEFULL.

- $\int a^x dx = \frac{a^x}{\ln|a|} + C \quad (a > 0, a \neq 1)$
- $\int \tan(x) dx = -\ln|\cos(x)| + C$
- $\int \cot(x) dx = \ln|\sin(x)| + C$
- $\int \sec(x) dx = \ln|\sec(x) + \tan(x)| + C$
- $\int \csc(x) dx = -\ln|\csc(x) + \cot(x)| + C$
- $\int \frac{dx}{\sqrt{a^2 - x^2}} = \sin^{-1}\left(\frac{x}{a}\right) + C$
- $\int \frac{dx}{a^2 + x^2} = \frac{1}{a} \tan^{-1}\left(\frac{x}{a}\right) + C$
- $\int \frac{dx}{x\sqrt{x^2 - a^2}} = \frac{1}{a} \sec^{-1}\left(\left|\frac{x}{a}\right|\right) + C$
- $\int \frac{dx}{\sqrt{a^2 + x^2}} = \sinh^{-1}\left(\frac{x}{a}\right) + C \quad (a > 0)$
- $\int \frac{dx}{\sqrt{x^2 - a^2}} = \cosh^{-1}\left(\frac{x}{a}\right) + C \quad (x > a > 0)$
- $\int \frac{dx}{x\sqrt{a^2 - x^2}} = -\frac{1}{a} \operatorname{sech}^{-1}\left(\frac{x}{a}\right) + C \quad (x < a < 0)$
- $\int \frac{dx}{x\sqrt{a^2 + x^2}} = -\frac{1}{a} \operatorname{csch}^{-1}\left(\left|\frac{x}{a}\right|\right) + C \quad (a > 0, x \neq 0)$
- $\int \frac{dx}{a^2 - x^2} = \begin{cases} \frac{1}{a} \tanh^{-1}\left(\frac{x}{a}\right) + C & , (x^2 < a^2) \\ \frac{1}{a} \operatorname{coth}^{-1}\left(\frac{x}{a}\right) + C & , (x^2 > a^2) \end{cases}$

- $\cos^{-1}(x) + \sin^{-1}(x) = \frac{\pi}{2}$
- $\cot^{-1}(x) + \tan^{-1}(x) = \frac{\pi}{2}$
- $\cos^{-1}(-x) + \cos^{-1}(x) = \pi$
- $\csc^{-1}(x) + \sec^{-1}(x) = \frac{\pi}{2}$

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QUESTION 1

Three Branches

(2 + 2 + 2 points)

1. Find the derivative of the following function $y = \sin^{-1}(e^{2x}) \times \operatorname{sech}(3^x) + \tan^{-1}\left(\frac{5x}{4}\right)$

2. Evaluate the following quantity $\csc\left[\sin^{-1}\left(\frac{1}{2}\right) + \sec^{-1}(-2)\right]$

3. Solve for x: $\cos^2(3x) + 2\cos(3x) = 1.5$

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QUESTION 2

Two Branches

(4 + 4 points)

Evaluate the following integrals

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

2.
$$\int x^5 \tan^{-1}(x) dx$$

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QUESTION 3

Two Branches

(4 + 4 points)

Evaluate the following integrals

1. $\int \frac{1}{\sqrt{x^2 - 12x}} dx$

2. $\int \sinh(x) \cos(x) dx$

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QUESTION 4

Two Branches

(2 + 3 points)

Evaluate the following integral

1. $\int [\cos^{-1}(x)]^3 dx$

Does the following integral converge or diverge?

2. $\int_{-\infty}^{\infty} \frac{q}{(q^2 + 4)^{\frac{3}{2}}} dq$

End Of Exam
Good Luck

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