

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

UNIVERSITY OF PALESTINE



First Exam  
Grade 30/2  
Second semester 2018/2019

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

**QUESTION 1**

( 8 *points* )

1. Considering the function  $f(x) = \sqrt{3x - 2}$

- Show that  $f(x)$  is one-to-one.

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

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

2. If  $f(x) = x^2 - 4x - 5 ; x > 2$ . Find the value of  $\left. \frac{df^{-1}}{dx} \right|_{f(5)}$

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**QUESTION 2**

(9 points)

1. Which of the two functions  $f_1 = e^{x^2}$  and  $f_2 = e^x$  grows faster as  $x \rightarrow \infty$ ?

2. Find the derivative of

•  $y = \cosh\left(\log_2\left(\ln^3(x^2)\right)\right) + e^{3\ln(x)} + \ln^2(\pi^e)$

•  $y = 7^{\tan(5^\circ)} + \int_0^{\log_5(x)} \sin(e^t) dt + \operatorname{csch}(3x^4)$

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**QUESTION 3**

( 6 *points* )

1. Find the following limit:

$$\lim_{x \rightarrow \infty} \left( 1 + e^x \right)^{\left( \frac{1}{x} \right)}$$

2. Solve  $\ln(\sec t) + \ln(\cos t) = 3 \ln(\sqrt[3]{t^2 - 1})$  for t.

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**QUESTION 4**

( 7 points )

1. Evaluate the integrals:

$$\bullet \int \left[ \frac{1}{x} \log_2(x^2) - \frac{8^{2-x}}{5 + 2^{-3x}} \right] dx$$

$$\bullet \int \left[ \frac{\sinh(t)}{e^t + e^{-t}} + \cot\left(\frac{2}{5} \pi\right) \right] dt$$

End of Questions

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**BONUS QUESTION**

• Solve  $\frac{3^x - 3^{1-x}}{2} = 1$  for x. 2 points/30

• Find the inverse function of  $f = \ln(\ln(x))$ ,  
and show that,  $f(f^{-1}(x)) = f^{-1}(f(x)) = x$  1 point/30