
الفرقة :
عنوان موضوع البحث:

اسم الطالب :
الشعبة :
اسم المقرر :

Problem	Total Points
1	
2	
3	
4	
5	
6	
7	
8	
9	
10	
Total	100

ترسل الابحاث الي :-

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٢- د. عبدالله السيد علي الصقتي

First question : (10 Points)

a) Find formulas for $f \circ g$ and $g \circ f$, where

$$f(x) = \sqrt{x^2 - 3}, \quad g(x) = x^2 + 3$$

b) Discuss the continuity of the following function at $x=1$.

$$f(x) = \begin{cases} x & \text{if } 0 \leq x < 1 \\ 2 & \text{if } x = 1 \\ x + 1 & \text{if } 1 < x \leq 2 \end{cases}$$

Second question : (10 Points)

a) Find the following limits : -

$$(i) \lim_{x \rightarrow -3} \frac{x^2 + x - 6}{x + 3} \quad (ii) \lim_{x \rightarrow \pi} \frac{\sin x}{x - \pi}$$

(b) Find dy/dx when:

$$(i) y = \sin^{-1}(3x - 4x^3) \quad (ii) y = \sqrt{3x^3 + 7}$$

Third question : (10 Points)

a) Find dy/dx when:

(i) $x^3y^3 + 5x = \sqrt{x}$ (ii) $y = \ln(\sec x + \tan x)$

b) Find dy/dx when

(i) $y = 4 \operatorname{arc} \tan \sqrt{x^2 - 1}$ (ii) $y = 4^{3x^2}$

Fourth question : (10 Points)

a) Find dy/dx when

$$(i) y = x^{x^2} \quad (ii) y = \frac{\sin x + \cos x}{\sqrt{x}}$$

b) - Determine whether the following functions are even, odd or neither.

$$(i) f(x) = |x| - 1 \quad (ii) f(x) = \sqrt{x}$$

Fifth question : (10 Points)

a) Find $\frac{d^2y}{dx^2}$ when : (i) $x = 2\cos t$, $y = 3\sin t$. (ii) $y = \sqrt{x} + \frac{1}{\sqrt{x}}$.

b) Find $\lim_{x \rightarrow 0} \frac{x^2}{1 - \cos 2x}$

Sixth question : (10 Points)

Find : a) $\int (1 + \tan^2 x) dx$

b) $\int \frac{x^2+x+3}{\sqrt{x}} dx$

Seventh question : (10 Points)

Find: a) $\int \frac{x}{\sqrt{2x^2+1}} dx$

b) $\int_0^{1/4} \frac{1}{\sqrt{1-4x^2}} dx$

Eighth question : (10 Points)

Find : a) $\int \frac{3x^2 - 2x + 5}{\sqrt[4]{x}} dx$ b) $\int \cos^7 x \sin x dx$

Ninth question : (10 Points)

Find : a) $\int \frac{e^x}{\sqrt{1+e^x+e^{2x}}} dx$

b) $\int \frac{dx}{1-\cos x}$

Tenth question : (10 Points)

- a) Using the definite integral to find the area of a circle of radius a .
- b) Find the length of the curve $y = e^{-x}$, $0 \leq x \leq 1$