King Saud University
Faculty of Sciences
Department of Mathematics

Final Examination	Math 106	Trimester II - 1444
	Time: 3H	

Question 1 : (2+2+3)

1. If $F(x) = \int_{x^2+1}^{6} \cos\sqrt{t^2+1}\,dt$. Find $F'(x)$.

2. Compute $\int \dfrac{dx}{x((\ln x)^2+9)}$

3. Evaluate the integral $\int \dfrac{dx}{x\sqrt{1-x^6}}$

Question 2 : (3+3+3)

1. Find $\lim\limits_{x\longrightarrow 0^+} \left(\dfrac{1}{x}\right)^{x^2}$.

2. Compute the indefinite integral $\int x^4 \ln x\,dx$.

3. Evaluate $\int (\sin x)^5 (\cos x)^6 dx$.

Question 3 : (3+3+3)

1. Compute $\int \dfrac{dx}{(16-x^2)^{\frac{3}{2}}}$.

2. Evaluate $\int \dfrac{x^2+1}{x^3-x}dx$.

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Midterm Exam	Math 106	January 2023

Question 1 : (2+3+3+2+3+3)

1. Let $F(x) = \int_{2x}^{x^2} \frac{dt}{1+t^4}$. Find $F'(x)$.
2. Use Trapezoid rule with $n = 4$ to approximate the integral $\int_0^4 \frac{dx}{\sqrt{1+x^3}}$.
3. Find the number c that satisfies the conclusion of the mean value theorem for the function $f(x) = \sqrt{x+3}$ on $[-2, 6]$.
4. Evaluate the integral $\int \frac{x^2 e^{4x^3}}{1+e^{4x^3}} dx$.
5. Use logarithmic differentiation to find $\frac{dy}{dx}$ if $y = x^{2x} \frac{(1+x^3)^{\frac{4}{3}}}{(3+x^2)^{\frac{3}{2}}}$.
6. Compute the integral $\int \frac{x 5^{x^2}}{1+5^{2x^2}} dx$.

Question 2 : (3+3+3+3+2)

1. Compute $\int \frac{dx}{x \ln x \sqrt{(\ln x)^4 - 1}}$, $(x > e)$
2. Find the indefinite integral $\int \frac{dx}{x\sqrt{4-x^4}}$, $(0 < x < 2)$.
3. Evaluate the integral $\int (1 + \frac{1}{x}) \ln x dx$.
4. Find $\int (\tan x)^4 (\sec x)^4 dx$
5. Compute the integral $\int \cos(6x) \cos(2x) dx$.

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First Examination Math 106 Semester I
November 2021 Time: 2H

1. Use simpson's rule, with $n = 4$, to approximate the integral $\int_1^3 \sqrt{1+x^2}dx$.

2. Evaluate the integral $\int \frac{(1-\frac{1}{x^2})^5}{x^3}dx$.

3. Find $\frac{dy}{dx}$ if $y = \sqrt{x}.\sqrt[3]{x+2}.\sqrt[5]{x-1}$.

4. Evaluate the integral $\int \frac{(\sec x)^2}{\sqrt{4-(\tan x)^2}}dx$.

5. Compute the integral $\int \frac{dx}{\sqrt{e^{2x}-1}}$.

6. Find the indefinite integral $\int \frac{dx}{x\sqrt{1-x^5}}$.

7. Compute $\lim_{x\to 0} \frac{\cos x - 1 + \frac{x^2}{2}}{x^4}$.

8. Integrate by parts twice to compute $\int (\ln x)^2 dx$.

9. Find $\int (\tan x)^5 (\sec x)^3 dx$.

10. Evaluate the integral $\int \frac{x^2}{\sqrt{9-x^2}}dx$.

11. Compute the indefinite integral $\int \frac{x^2+8x+10}{x^2+6x+11}dx$.

KING SAUD UNIVERSITY **Math Department**

April 2022 **Math 106 midterm(120mn)**

Part 1[2+2+3+2+3+3+3]

a) Use Trapezoid rule, with $n = 4$, to approximate $\int_0^4 x^2\sqrt{1+x^2}\,dx$

b) Find the number α so that $\sum_{k=1}^{k=n}(2k+\alpha) = n^2$

c) Find the number z that satisfies the mean value theorem for $f(x) = 2 + 3x^2$ on [0,4]

d) If $y = (2+\sqrt{x})^{x^2}$, compute $\frac{dy}{dx}$

e) Evaluate the integral $\int \frac{e^{5x}}{e^{10x}+16}\,dx$

f) Find the indefinite integral $\int \frac{dx}{x\sqrt{x^6-4}}$

g) Compute $\int \frac{dx}{x\sqrt{9+(lnx)^2}}$

Part 2[3+3+3+3]

a) Evaluate $\int x\tan^{-1}x\,dx$

b) Find $\int (sinx)^5(cosx)^4 dx$

c) Evaluate the integral $\int \frac{1}{(4-x^2)^{3/2}}\,dx$

d) Compute the indefinite integral $\int \frac{6x+6}{(x-4)(x+2)}\,dx$