KING SAUD UNIVERSITY
College of Science
Department of Mathematics

M-106

Summer Term (1430/1431)

Mid-Term Exam

Name:	Number:
Name of Teacher:	Group No:

Max Marks: 40 Time: Two hours

Marks:

Multiple Choice (1-15)	
Question # 16	
Question # 17	
Question # 18	
Question # 19	
Question # 20	
Total	

Multiple Choice

Q.No:	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
$\{a, b, c, d\}$															

Q. No: 1 The average value of the function $f(x) = \dfrac{1}{x^2+4}$ on $[0, 2]$ is equal to:

(a) $\dfrac{\pi}{16}$ (b) $\dfrac{\pi}{4}$ (c) $\dfrac{\pi}{8}$ (d) $\dfrac{\pi}{2}$

Q. No: 2 Let $P = \{x_0, x_1, x_2, ..., x_{n-1}, x_n\}$ be a partition of $[0, 2]$.

Then $\lim\limits_{\|P\|\to 0} \sum\limits_{k=1}^{n} \Delta x_k$ is equal to:

(a) 0 (b) 1 (c) 2 (d) ∞

Q. No: 3 If $F(x) = \displaystyle\int_{-x}^{x} \sinh(t^3)\, dt$, then $F'(x)$ is equal to:

(a) $2\sinh(x^3)$ (b) $\sinh(x^3) - \sinh(x^2)$ (c) $\sinh(x^3) + \sinh(x^2)$ (d) 0

Q. No: 4 The number z that satisfies the conclusion of the Mean value Theorem for $f(x) = x^2$ on $[0, 2]$ is:

(a) $\sqrt{\dfrac{8}{3}}$ (b) $\dfrac{8}{\sqrt{3}}$ (c) $\dfrac{2}{\sqrt{3}}$ (d) $\sqrt{\dfrac{2}{3}}$

Q. No: 5 If $f(x) = x^{2x}$, then $f'(1)$ is equal to:

(a) 0 (b) e (c) 1 (d) 2

Q. No: 6 The value of the integral $\displaystyle\int_0^1 5^x dx$ is equal to:

(a) $\dfrac{4}{\ln 5}$ (b) $\dfrac{5}{\ln 5}$ (c) 4 (d) $\dfrac{\ln 5}{4}$

Q. No: 7 The integral $\displaystyle\int \frac{1}{\sqrt{x}\cos^2(\sqrt{x})} dx$ is equal to:

(a) $\frac{1}{2}\tan(\sqrt{x}) + c$ (b) $2\tan(\sqrt{x}) + c$ (c) $\tan(\sqrt{x}) + c$ (d) $\dfrac{-1}{\cos(\sqrt{x})} + c$

Q. No: 8 If $f(x) = \cosh^{-1}(\sec x)$ for $0 < x < \frac{\pi}{2}$, then $f'(x)$ is equal to:

(a) $\dfrac{\sec x \tan x}{\sqrt{1+\sec^2 x}}$ (b) $\tan x$ (c) $-\sec x$ (d) $\sec x$

Q. No: 9 To evaluate the integral $\int \frac{1}{x^2\sqrt{4x^2-9}}dx$, we use the substitution:

(a) $x = \frac{2}{3}\sec\theta$ (b) $x = \frac{3}{2}\tan\theta$ (c) $x = \frac{3}{2}\sec\theta$ (d) $x = \frac{9}{4}\sec\theta$

Q. No: 10 The range of the function $\cosh(x^2)$ is:

(a) $[0, \infty)$ (b) $[1, \infty)$ (c) $(-\infty, \infty)$ (d) $(-\infty, 0]$

Q. No: 11 $\lim\limits_{x\to 0}\dfrac{\int_0^x \ln(1+t)\,dt}{x^2}$ is equal to:

(a) 1 (b) $\frac{1}{2}$ (c) 2 (d) ∞

Q. No: 12 The integral $\int \frac{1}{\sqrt{1+(\sin^{-1}x)^2}\sqrt{1-x^2}}dx$ is equal to:

(a) $\cosh^{-1}(\cos^{-1}x) + c$ (b) $\sinh^{-1}(\cos^{-1}x) + c$

(c) $\sinh^{-1}(\sin^{-1}x) + c$ (d) $\sin^{-1}(\sinh^{-1}x) + c$

Q. No: 13 To evaluate the integral $\int \sin^3(x)\cos^4(x)\,dx$, we use the substitution:

(a) $u = \sin x$ (b) $u = \cos x$ (c) $u = \sec x$ (d) $u = \sin x \cos x$

Q. No: 14 The integral $\int \ln(x^3)\,dx$ is equal to:

(a) $3x\ln x - x + c$ (b) $3x\ln x - 3x + c$

(c) $x\ln x - 3x + c$ (d) $3\ln x - 3x + c$

Q. No: 15 The integral $\int \frac{e^x}{e^{2x}-4}dx$ is equal to:

(a) $\frac{-1}{2}\tanh^{-1}\left(\frac{e^x}{2}\right) + c$ (b) $\frac{1}{2}\tanh^{-1}(e^x) + c$

(c) $\tanh^{-1}\left(\frac{e^x}{2}\right) + c$ (d) $\frac{1}{2}\tanh^{-1}\left(\frac{e^x}{2}\right) + c$

Full Questions

Question No: 16 Approximate the integral $\int_0^2 \frac{1}{x^3+1}dx$ using the **Trapezoidal rule** with $n = 4$. [6]

Question No: 17 **Evaluate** $\int \frac{x-1}{\sqrt{3-4x^2}}dx$. [5]

)uestion No: 18 **Evaluate** $\int \frac{1}{(x^2+9)^2} dx.$ [6]

)uestion No: 19 **Evaluate** $\int x \cos(x)\, dx$ [4]

Question No: 20 **Evaluate** $\int \tan^4 x \sec^4 x dx$ [4]