MATH 106

Summer Semester (1433/1434)

Final Exam

Name:	Number:
Name of Teacher:	Group No:

Marks:

Multiple Choice

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

Q. No: 1 $\lim\limits_{x\to 0}\dfrac{\tan x - x}{x^2}$ is equal to:

$(a)\ \dfrac{1}{3}$ $(b)\ 0$ $(c)\ \dfrac{3}{2}$ $(d)\ \dfrac{2}{3}$

Q. No: 2 If $\exp(x^2) = \exp(4x - 4)$, then the value of x is equal to:

$(a)\ -2$ $(b)\ 2$ $(c)\ 1$ $(d)\ -1$

Q. No: 3 The partial fraction decomposition of $\dfrac{2x^2 + 2x + 10}{8x^4 + 12x^2 + 4}$ takes the form

$(a)\ \frac{A}{2x^2+1} + \frac{Bx+C}{2x^2+2}$ $(b)\ \frac{A}{2x^2+1} + \frac{Bx+C}{2x^2+2}$ $(c)\ \frac{Ax+B}{2x^2+1} + \frac{C}{2x^2+2}$ $(d)\ \frac{Ax+B}{2x^2+1} + \frac{Cx+D}{2x^2+2}$

Q. No: 4 $\displaystyle\int \frac{1}{x^2 - 6x + 13}dx$ is equal to:

$(a)\ \frac{1}{2}\tan^{-1}(\frac{x-3}{2}) + c$ $(b)\ \log|x^2 - 6x + 13| + c$

$(c)\ \frac{1}{3}\tan(\frac{x-3}{2}) + c$ $(d)\ \log|x - 3| + c$

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

$(a)\ (\ln 2)(\sec^2(x))2^{\tan x}$ $(b)\ (\sec^2(x))2^{\tan x}$

$(c)\ (\ln 2)(\sec(x)\tan(x))2^{\tan x}$ $(d)\ (\ln 2)(\sec^2(x))$

Q. No: 6 The area of the region bounded by the graphs of $y = x^2$ and $y = |x|$ is equal to:

$(a)\ \frac{1}{3}$ $(b)\ 1$ $(c)\ \frac{2}{3}$ $(d)\ \frac{4}{3}$

Q. No: 7 To evaluate the integral $\int \frac{\sqrt[3]{x}}{x+x^{\frac{2}{3}}}dx$, we use the substitution:

(a) $u=\sqrt{x}$ (b) $u=x^{\frac{1}{3}}$ (c) $u=x^{\frac{1}{5}}$ (d) $u=x^{\frac{2}{5}}$

Q. No: 8 The volume of the solid abtained by revolving the region bounded by the graphs of $y=\frac{1}{x+1}, y=0; x=0$ and $x=1$ about the $x-$axis is equal to:

(a) $\frac{\pi}{4}$ (b) $\frac{\pi}{2}$ (c) π (d) 2π

Q. No: 9 If $(x,y)=(0,-2)$ then its polar coordinates (r,θ) equals to:

(a) $(-2,\pi)$ (b) $\left(2,\frac{3\pi}{2}\right)$ (c) $\left(2,\frac{\pi}{2}\right)$ (d) None of these

Q. No: 10 The arc length of the polar curve $C: r=4\sin\theta, 0\leq\theta\leq\frac{\pi}{2}$ equal to:

(a) $\frac{\pi}{2}$ (b) π (c) 2π (d) 4π

Full Questions

uestion No: 11 **Approximate** $\int_1^2 \frac{1}{1+\ln x}dx$ by using **Simpson's** rule with $n = 4$. [**3** marks]

uestion No: 12 **Evaluate** $\int \frac{x^2+3x+1}{x^4+5x^2+4}dx$ [**4** marks]

uestion No: 13 **Evaluate** $\int \sin(x)\ln(\cos(x))dx$ [**4** marks]

uestion No: 14 **Evaluate** $\int \frac{1}{x^2\sqrt{x^2+16}}dx$ [**5** marks]

uestion No: 15 **Find** the area of the surface generated by revolving about the $x-$axis the curve $x = t^2, y = t - \frac{t^3}{3}$; where $0 \leq t \leq 1$.[4], [**4** marks]

uestion No: 16 Let R be the region bounded by the graph of the equations $y = e^x$ and $y = 0$, $x = 0$ and $x = 1$.

Sketch the region R and **evalute** the volume of the solid obtained by revolving the region R about the x axis. [**5** marks]

uestion No: 17 **Sketch** the region inside the polar curve $r = 2\cos\theta$ and outside the polar curve $r = 1$, and **find** its area. [**5** marks]