

# MATH 106

## Summer Semester (1433/1434)

### Second Mid-Exam

Name:	Number:
Name of Teacher:	Group No:

Marks:

#### Multiple Choice

Q.No:	1	2	3	4	5
{a, b, c, d}					

Q. No: 1  $\lim_{x \rightarrow \infty} \frac{e^x + e^{-x}}{e^{-x} - e^x}$  is equal to:

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

Q. No: 2 The partial fraction decomposition of  $\frac{x^2 - x + 106}{(x + 1)^2(x - 1)}$  takes the form:

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

Q. No: 3 The substitution  $u = \tan\left(\frac{x}{2}\right)$  transforms the integral  $\int \frac{1}{\sin x + \cos x} dx$  into:

- (a)  $\int \frac{2}{-u^2 + 2u + 1} du$     (b)  $\int \frac{2}{-u^2 - 2u + 1} du$     (c)  $\int \frac{2}{-u^2 + 2u - 1} du$     (d)  $\int \frac{1}{-u^2 + 2u + 1} du$

Q. No: 4 The improper integral  $\int_0^{\infty} \sin x dx$

- (a) Converges to 0      (b) Diverges      (c) Converges to  $\frac{\pi}{2}$       (d) Converges to 1

Q. No: 5 To evaluate the integral  $\int \frac{\sec x}{\cot^3(x)} dx$ , we use the substitution:

- (a)  $u = \tan x$     (b)  $u = \sin x$     (c)  $u = \cot x$     (d)  $u = \sec x$

## Full Questions

Question No: 6 **Evaluate**  $\int x^2 \ln\left(\frac{1}{x}\right) dx$  [4 marks]

Question No: 7 **Evaluate**  $\int \frac{1}{(x^2 + 2x + 5)^{\frac{3}{2}}} dx$  [4 marks]

Question No: 8 **Evaluate**  $\int \frac{3}{x^3 - 1} dx$  [4 marks]

Question No: 9 **Evaluate**  $\int \tan^3(x) dx$  [4 marks]

Question No: 10 **Sketch** and **find** the area of the region  $R$  bounded by  $y = \sqrt{x}$ ,  $y = 1$ ,  $x = 0$  and  $x = 2$ . [4 marks]