CUET Mathematics Test

Chapter: Integrals

General Instructions

1. Total Questions: **20**
2. Duration: **60 Minutes**
3. All questions are compulsory.
4. Each question carries **5 marks**.
5. For each correct answer: **+5 marks**.
6. For each incorrect answer: **-1 mark**.
7. No negative marking for unanswered questions.
8. Use of calculator or electronic devices is strictly prohibited.
9. Choose the most appropriate answer from the given options.

1. Evaluate $\int \frac{dx}{x^2-16}$
   (A) $\frac{1}{4}\log|\frac{x-4}{x+4}|+C$
   (B) $\frac{1}{8}\log|\frac{x-4}{x+4}|+C$
   (C) $\frac{1}{8}\log|\frac{x+4}{x-4}|+C$
   (D) $\frac{1}{4}\log|\frac{x+4}{x-4}|+C$

2. The value of $\int \frac{\sin x}{1+\cos^2 x}dx$ is:
   (A) $\tan^{-1}(\cos x)+C$
   (B) $-\tan^{-1}(\cos x)+C$
   (C) $\log|1+\cos^2 x|+C$
   (D) $\tan^{-1}(\sin x)+C$

3. Evaluate $\int e^x(\sin x+\cos x)dx$
   (A) $e^x\cos x+C$
   (B) $e^x\sin x+C$
   (C) $-e^x\sin x+C$
   (D) $e^x(\sin x-\cos x)+C$

4. $\int \frac{dx}{\sqrt{9-25x^2}}$ is equal to:
   (A) $\frac{1}{5}\sin^{-1}(\frac{5x}{3})+C$
   (B) $\frac{1}{3}\sin^{-1}(\frac{5x}{3})+C$
   (C) $\sin^{-1}(\frac{5x}{3})+C$
   (D) $\frac{1}{5}\sin^{-1}(\frac{3x}{5})+C$

5. Find $\int x\sec^2 x dx$
   (A) $x\tan x+\log|\cos x|+C$
   (B) $x\tan x-\log|\sec x|+C$
   (C) $x\tan x+\log|\sec x|+C$
   (D) $x\tan x-\log|\cos x|+C$

6. The integral $\int \frac{x^2+1}{x^2-5x+6}dx$ requires which technique first?
   (A) Integration by parts
   (B) Substitution $u=x^2$
   (C) Long division
   (D) Partial fractions directly

7. Evaluate $\int \frac{dx}{x^2+2x+2}$
   (A) $\tan^{-1}(x+1)+C$
   (B) $\tan^{-1}(x)+C$
   (C) $\log|x^2+2x+2|+C$
   (D) $\frac{1}{2}\tan^{-1}(x+1)+C$

8. $\int \log x dx$ is:
   (A) $1/x+C$
   (B) $x\log x+x+C$
   (C) $x\log x-x+C$
   (D) $x\log x+C$

9. Evaluate $\int \frac{dx}{x(x^2+1)}$
   (A) $\log|x|-\frac{1}{2}\log(x^2+1)+C$
   (B) $\log|x|+\frac{1}{2}\log(x^2+1)+C$
   (C) $\log|x^2+1|-\log|x|+C$
   (D) $\tan^{-1}x+C$

10. If $\int \frac{3x^2}{x^6+1}dx = \tan^{-1}(f(x)) + C$, then $f(x)$ is:
    (A) x^2
    (B) x^3
    (C) x^4
    (D) $3x$

11. Evaluate $\int \frac{dx}{\sqrt{x^2+2x+5}}$
    (A) $\log|x+1+\sqrt{x^2+2x+5}| + C$
    (B) $\sinh^{-1}(\frac{x+1}{4}) + C$
    (C) $\sin^{-1}(\frac{x+1}{2}) + C$
    (D) $\log|x+\sqrt{x^2+2x+5}| + C$

12. $\int \frac{e^{2x}-1}{e^{2x}+1}dx$ is equal to:
    (A) $\log|e^x + e^{-x}| + C$
    (B) $\log|e^x - e^{-x}| + C$
    (C) $e^x + e^{-x} + C$
    (D) $\log|e^{2x}+1| + C$

13. Find $\int \frac{x}{(x-1)(x-2)}dx$
    (A) $\log|\frac{(x-2)^2}{x-1}| + C$
    (B) $\log|\frac{x-1}{(x-2)^2}| + C$
    (C) $2\log|x-2| - \log|x-1| + C$
    (D) Both (A) and (C)

14. Evaluate $\int \frac{\sec^2 x}{\sqrt{\tan^2 x+4}}dx$
    (A) $\log|\tan x + \sqrt{\tan^2 x+4}| + C$
    (B) $\sin^{-1}(\frac{\tan x}{2}) + C$
    (C) $\tan^{-1}(\frac{\tan x}{2}) + C$
    (D) $\log|\sec x| + C$

15. $\int \frac{dx}{\sqrt{1-e^{2x}}}$ is solved by substituting:
    (A) $x = \sin\theta$
    (B) $e^x = \sin\theta$
    (C) $e^x = t$
    (D) $1 - e^{2x} = t$

16. Find $\int x^2 e^x dx$
    (A) $e^x(x^2 - 2x + 2) + C$
    (B) $e^x(x^2 + 2x + 2) + C$
    (C) $e^x(x^2 - 2x) + C$
    (D) $x^2e^x - 2xe^x + C$

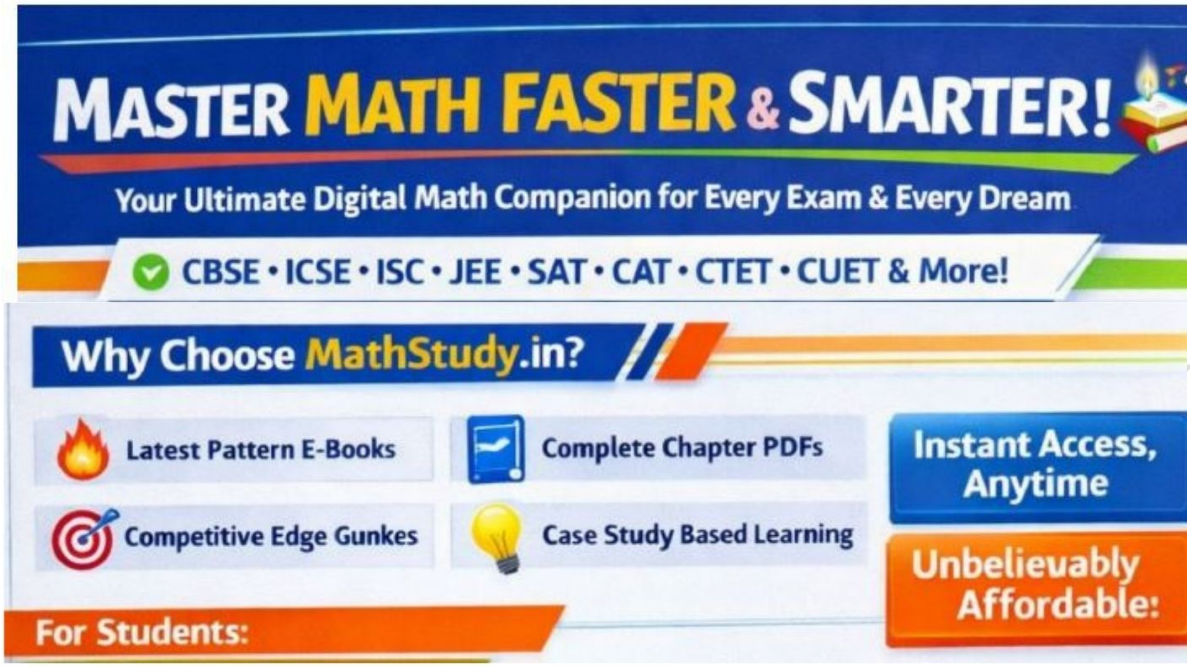
17. Evaluate $\int \frac{dx}{9x^2-1}$
    (A) $\frac{1}{6}\log|\frac{3x-1}{3x+1}| + C$
    (B) $\frac{1}{2}\log|\frac{3x-1}{3x+1}| + C$
    (C) $\frac{1}{3}\log|\frac{3x-1}{3x+1}| + C$
    (D) $\log|9x^2 - 1| + C$

18. $\int \frac{\cos\sqrt{x}}{\sqrt{x}}dx$ is equal to:
    (A) $2\sin\sqrt{x} + C$
    (B) $\sin\sqrt{x} + C$

(C) $\frac{1}{2}\sin\sqrt{x}+C$
(D) $2\cos\sqrt{x}+C$

19. The integral $\int \frac{dx}{x^2+a^2}$ results in:
(A) $\frac{1}{a}\tan^{-1}(\frac{x}{a})+C$
(B) $\tan^{-1}(\frac{x}{a})+C$
(C) $\frac{1}{a}\sin^{-1}(\frac{x}{a})+C$
(D) $\log|x^2+a^2|+C$

20. Evaluate $\int \frac{x+3}{x^2-2x-5}dx$ involves:
(A) Expressing numerator as $A\frac{d}{dx}(\text{denominator})+B$
(B) Partial fractions only
(C) Substitution $x+3=t$
(D) Integration by parts



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