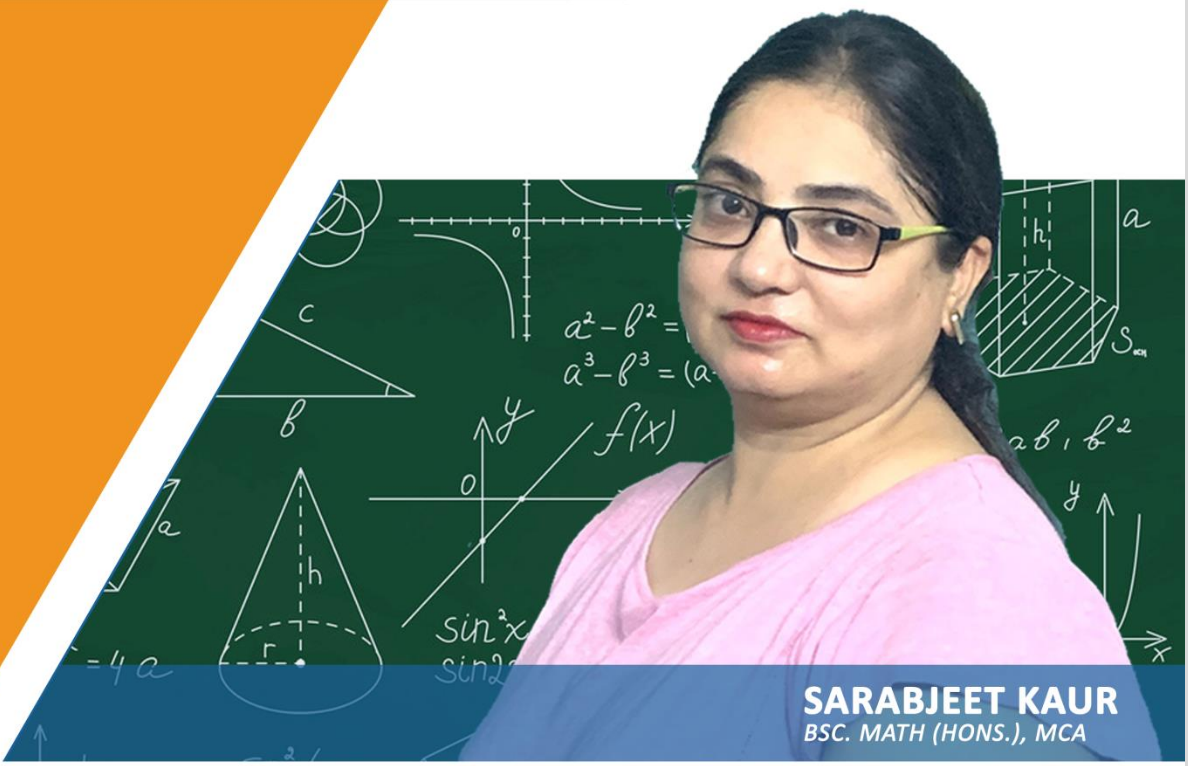
CAREER+ ACADEMY



GRADE 12TH MATHS

CHAPTER 7

Integration

www.careerplusacademy.com careerplusacademy@gmail.com

/careerplusacademy /in/sarabkaur /careerplusacademy +91-987-111-5373

INTEGRALS

CONCEPT TYPE QUESTIONS

Directions : This section contains multiple choice questions. Each question has four choices (a), (b), (c) and (d), out of which only one is correct.

1. $\int x^x(1+\log x)dx$ is equal to

(a) x^x (b) x^{2x}

(c) $x^x \log x$ (d) $1/2\,(1+\log x)^2$

2. $\int x^{51}(\tan^{-1}x+\cot^{-1}x)dx$

(a) $\frac{x^{52}}{52}(\tan^{-1}x+\cot^{-1}x)+c$

(b) $\frac{x^{52}}{52}(\tan^{-1}x-\cot^{-1}x)+c$

(c) $\frac{\pi x^{52}}{104}+\frac{\pi}{2}+c$

(d) $\frac{x^{52}}{52}+\frac{\pi}{2}+c$

3. Let $\int \frac{x^{1/2}}{\sqrt{1-x^3}}dx=\frac{2}{3}gof(x)+C$, then

(a) $f(x)=\sqrt{x}$

(b) $f(x)=x^{3/2}$ and $g(x)=\sin^{-1}x$

(c) $f(x)=x^{2/3}$

(d) None of these

4. $\int \sec^{2/3}x\,\mathrm{cosec}^{4/3}x\,dx=$

(a) $-3(\tan x)^{1/3}+c$ (b) $-3(\tan x)^{-1/3}+c$

(c) $3(\tan x)^{-1/3}+c$ (d) $(\tan x)^{-1/3}+c$

5. $\int_{\log 1/2}^{\log 2} \sin\left\{\frac{e^x-1}{e^x+1}\right\}dx$ equals

(a) $\cos\frac{1}{3}$ (b) $\sin\frac{1}{2}$

(c) $2\cos 2$ (d) 0

6. Evaluate: $\int 2^{2^{2^x}}\,2^{2^x}\,2^x\,dx$

(a) $\frac{1}{(\log 2)^3}2^{2^{2^x}}+C$ (b) $\frac{1}{(\log 2)^3}2^{2^x}+C$

(c) $\frac{1}{(\log 2)^2}2^{2^x}+C$ (d) $\frac{1}{(\log 2)^4}2^{2^{2x}}+C$

7. $\int \frac{10x^9+10^x\log_e 10}{10^x+x^{10}}dx$ is equal to

(a) $10^x-x^{10}+C$ (b) $10^x+x^{10}+C$

(c) $(10^x-x^{10})^{-1}+C$ (d) $\log_e(\log^x+x^{10})+C$

8. If $\int \frac{e^x(1+\sin x)dx}{1+\cos x}=e^x f(x)+C$, then f(x) is equal to

(a) $\sin\frac{x}{2}$ (b) $\cos\frac{x}{2}$

(c) $\tan\frac{x}{2}$ (d) $\log\frac{x}{2}$

9. $\int e^x\left(\frac{1-\sin x}{1-\cos x}\right)dx$ is equal to

(a) $-e^x\tan\left(\frac{x}{2}\right)+C$ (b) $-e^x\cot\left(\frac{x}{2}\right)+C$

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

10. Evaluate $\int_1^2 x^2dx$ as limit of sums.

(a) 1 (b) $\frac{7}{3}$

(c) $\frac{1}{3}$ (d) 0

11. Evaluate: $\int_0^{\pi/2}\frac{\cos x}{\left(\cos\frac{x}{2}+\sin\frac{x}{2}\right)^3}dx$

(a) $2-\sqrt{2}$ (b) $2+\sqrt{2}$

(c) $3+\sqrt{3}$ (d) $3-\sqrt{3}$

12. $\int \frac{x^9}{(4x^2+1)^6}dx$ is equal to

(a) $\frac{1}{5x}\left(4+\frac{1}{x^2}\right)^{-5}+C$ (b) $\frac{1}{5}\left(4+\frac{1}{x^2}\right)^{-5}+C$

(c) $\frac{1}{10x}\left(\frac{1}{x}+4\right)^{-5}+C$ (d) $\frac{1}{10}\left(\frac{1}{x^2}+4\right)^{-5}+C$

13. $\int \cos\left\{2\tan^{-1}\sqrt{\frac{1-x}{1+x}}\right\}dx$ is equal to

(a) $\frac{1}{8}(x^2-1)+k$ (b) $\frac{1}{2}x^2+k$

(c) $\frac{1}{2}x+k$ (d) None of these

14. $\int e^{3\log x}(x^4+1)^{-1}dx$ is equal to

(a) $\log(x^4+1)+C$ (b) $\frac{1}{4}\log(x^4+1)+C$

(c) $-\log(x^4+1)+C$ (d) None of these

15. The value of integral $I = \int_3^6 \frac{\sqrt{x}}{\sqrt{9-x}+\sqrt{x}}dx$ is

(a) 1/2 (b) 3/2 (c) 2 (d) 1

16. The value of $\int \frac{e^{2x}-e^{-2x}}{e^{2x}+e^{-2x}}dx$ is

(a) $\frac{1}{2}\log\left|e^{x}+e^{-x}\right|+C$ (b) $2\log\left|e^{2x}+e^{-2x}\right|+C$

(c) $\frac{1}{2}\log\left|e^{2x}+e^{-2x}\right|+C$ (d) None of these

17. $\int \frac{e^x(1+x)}{\cos^2(e^x x)}dx$ equals

(a) $-\cot(ex^x)+C$ (b) $\tan(xe^x)+C$
(c) $\tan(e^x)+C$ (d) $\cot(e^x)+C$

18. $\int \frac{\sqrt{x}}{\sqrt{a^3-x^3}}dx$ equal to

(a) $\frac{1}{3}\sin^{-1}\sqrt{\frac{x^3}{a^3}}+C$ (b) $\frac{2}{3}\sin^{-1}\sqrt{\frac{x^3}{a^3}}+C$

(c) $\frac{2}{3}\sin^{-1}\sqrt{\frac{x}{a}}+C$ (d) None of these

19. The value of $\int\sqrt{\frac{a-x}{a+x}}dx$ is

(a) $a\sin^{-1}\left(\frac{x}{a}\right)+\sqrt{x^2-a^2}+C$

(b) $a\sin^{-1}\left(\frac{x}{a}\right)+\sqrt{a^2-x^2}+C$

(c) $a\sin^{-1}\left(\frac{a}{x}\right)+\sqrt{x^2-a^2}+C$

(d) None of these

20. If $\int \sin^3 x\cos^5 x\,dx = A\sin^4 x+B\sin^6 x+C\sin^8 x+D$. Then

(a) $A=\frac{1}{4},\ B=-\frac{1}{3},\ C=\frac{1}{8},\ D\in R$

(b) $A=\frac{1}{8},\ B=\frac{1}{4},\ C=\frac{1}{3},\ D\in R$

(c) $A=0,\ B=-\frac{1}{6},\ C=\frac{1}{8},\ D\in R$

(d) None of these.

21. $\int\left(x+\frac{1}{x}\right)^{n+5}\left(\frac{x^2-1}{x^2}\right)dx$ is equal to :

(a) $\frac{\left(x+\frac{1}{x}\right)^{n+6}}{n+6}+c$ (b) $\left[\frac{x^2+1}{x^2}\right]^{n+6}(n+6)+c$

(c) $\left[\frac{x}{x^2+1}\right]^{n+6}(n+6)+c$ (d) None of these

22. Value of $\int_0^4 \frac{1}{\sqrt{x^2+2x+3}}dx$ is

(a) $\log\left(\frac{1+\sqrt{3}}{5+3\sqrt{3}}\right)$ (b) $\log\left(\frac{5-3\sqrt{3}}{1-\sqrt{3}}\right)$

(c) $\log\left(\frac{5+3\sqrt{3}}{1+\sqrt{3}}\right)$ (d) None of these

23. $\int \sin 2x.\log\cos x\,dx$ is equal to

(a) $\cos^2 x\left(\frac{1}{2}+\log\cos x\right)+k$

(b) $\cos^2 x.\log\cos x+k$

(c) $\cos^2 x\left(\frac{1}{2}-\log\cos x\right)+k$

(d) None of these.

STATEMENT TYPE QUESTIONS

Directions : Read the following statements and choose the correct option from the given below four options.

24. Which of the following is/are correct?

I. $\int\frac{dx}{x\sqrt{x^2-1}}=\operatorname{cosec}^{-1}x+C$

II. $\int e^x dx=\log e^x+C$

III. $\int\frac{1}{x}dx=\log|x|+C$

IV. $\int a^x dx=a^x+C$

(a) I and III are correct (b) All are correct
(c) Only III is correct (d) All are incorrect

25. Consider the following statements

Statement-I: The value of $\int \frac{dx}{\sqrt{16-9x^2}}$ is $\frac{1}{3}\sin^{-1}\frac{3x}{4}+C$

Statement-II: The value of $\int \frac{dt}{\sqrt{3t-2t^2}}$ is $\frac{1}{\sqrt{2}}\sin^{-1}\left(\frac{3-4t}{3}\right)+C$.

(a) Statement I is true
(b) Statement II is true
(c) Both statements are true
(d) Both statements are false

26. Consider the following statements

Statement-I : The value of $\int_0^1 \frac{x^4(1-x)^4}{1+x^2}dx$ is $\frac{22}{7}-\pi$.

Statement-II : The value of integral $\int_{-1}^{1} \frac{|x+2|}{x+2}dx$ is 2.

(a) Statement I is true
(b) Statement II is true
(c) Both statements are true
(d) Both statements are false

27. Consider the following statements

Statement-I: $\int_0^{\lambda} \frac{y\,dy}{\sqrt{y+\lambda}}$ is equal to $\frac{2}{3}(2+\sqrt{2})\lambda\sqrt{\lambda}$.

Statement-II: $3a\int_0^1\left(\frac{ax-1}{a-1}\right)^2 dx$ is equal to $(a-1)+(a-1)^2$.

(a) Statement I is true
(b) Statement II is true
(c) Both statements are true
(d) Both statements are false

28. Consider the following statements

Statement-I: $\int_{-a}^{a} f(x)dx = 2\int_0^a f(x)dx$ if f is an odd function i.e., $f(-x) = -f(x)$.

Statement-II: $\int_{-a}^{a} f(x)dx = 0$, if f is an even function i.e., if $f(-x) = f(x)$.

(a) Statement I is true
(b) Statement II is true
(c) Both statements are true
(d) Both statements are false

MATCHING TYPE QUESTIONS

Directions : Match the terms given in column-I with the terms given in column-II and choose the correct option from the codes given below.

29. Match the following derivatives of the functions in column-I with their respective anti-derivatives in column-II.

Column - I	Column - II
A. $\frac{1}{\sqrt{1-x^2}}$	1. $\tan^{-1}x+C$
B. $\frac{-1}{\sqrt{1-x^2}}$	2. $\cot^{-1}x+C$
C. $\frac{1}{1+x^2}$	3. $\sin^{-1}x+C$
D. $\frac{-1}{1+x^2}$	4. $\cos^{-1}x+C$

Codes

	A	B	C	D
(a)	1	2	3	4
(b)	3	4	2	1
(c)	3	4	1	2
(d)	4	3	2	1

30. Match the following integrals in column-I with their corresponding values in column-II.

Column-I	Column-II
A. $\int\sqrt{ax+b}\,dx$	1. $\frac{2}{5}(x+2)^{5/2} - \frac{4}{3}(x+2)^{3/2}+C$
B. $\int x\sqrt{x+2}\,dx$	2. $\frac{1}{6}\left(1+2x^2\right)^{3/2}+C$
C. $\int x\sqrt{1+2x^2}\,dx$	3. $\frac{4}{3}\left(x^2+x+1\right)^{3/2}+C$
D. $\int(4x+2)\sqrt{x^2+x+1}\,dx$	4. $\frac{2}{3a}(ax+b)^{3/2}+C$

Codes

	A	B	C	D
(a)	4	1	2	3
(b)	3	4	2	1
(c)	1	3	2	4
(d)	3	2	4	1

31. Match the following integrals in column-I with their corresponding solutions in column-II.

Column - I	Column - II
A. $\int \frac{\cos x - \sin x}{1+\sin 2x} dx$	1. $\frac{1}{6}\sec^3 2x - \frac{1}{2}\sec^2 2x + C$
B. $\int \tan^3 2x \sec 2x \, dx$	2. $\tan x + C$
C. $\int \frac{\sin^3 x + \cos^3 x}{\sin^2 x \cos^2 x} dx$	3. $\frac{-1}{\sin x + \cos x} + C$
D. $\int \frac{\cos 2x + 2\sin^2 x}{\cos^2 x} dx$	4. $\sec x - \operatorname{cosec} x + C$

Codes

	A	B	C	D
(a)	1	2	3	4
(b)	3	1	4	2
(c)	3	4	1	2
(d)	2	1	4	3

32. Match the following definite integrals in column-I with their corresponding values in column-II.

Column - I	Column - II
A. $\int_{-1}^{1} x^{17}\cos^4 x \, dx$	1. $\frac{\pi}{2} - 1$
B. $\int_{0}^{\pi/2} \sin^3 x \, dx$	2. 0
C. $\int_{0}^{\pi/4} 2\tan^3 x \, dx$	3. $\frac{2}{3}$
D. $\int_{0}^{1} \sin^{-1} x \, dx$	4. $1 - \log 2$

Codes

	A	B	C	D
(a)	1	3	2	4
(b)	2	3	4	1
(c)	1	2	3	4
(d)	2	4	3	1

INTEGER TYPE QUESTIONS

Directions : This section contains integer type questions. The answer to each of the question is a single digit integer, ranging from 0 to 9. Choose the correct option.

33. The value of $\int_0^1 \tan^{-1}\left(\frac{2x-1}{1+x+x^2}\right) dx$ is

(a) 1 (b) 0 (c) – 1 (d) $\frac{\pi}{4}$

34. $\int_0^{2\pi} \log\left(\frac{a+b\sec x}{a-b\sec x}\right) dx =$

(a) 0 (b) $\pi/2$ (c) $\frac{\pi(a+b)}{a-b}$ (d) $\frac{\pi}{2}(a^2-b^2)$

35. Value of $\int_2^8 \frac{\sqrt{10-x}}{\sqrt{x}+\sqrt{10-x}} dx$ is

(a) 2 (b) 3 (c) 4 (d) 5

36. The value of $\int_{-1}^{1} (x-[x]) dx$ (where [.] denotes greatest integer function) is

(a) 0 (b) 1 (c) 2 (d) None of these

37. The value of definite integral $\int_0^{\frac{\pi}{2}} \log(\tan x) \, dx$ is

(a) 0 (b) $\frac{\pi}{4}$ (c) $\frac{\pi}{2}$ (d) π

38. If m is an integer, then $\int_0^{\pi} \frac{\sin(2mx)}{\sin x} dx$ is equal to :

(a) 1 (b) 2 (c) 0 (d) π

39. The value of $\int_0^{\frac{\pi}{2}} \log\left(\frac{4+3\sin x}{4+3\cos x}\right) dx$ is

(a) 2 (b) $\frac{3}{4}$ (c) 0 (d) – 2

40. The value of $\int_0^1 \tan^{-1}\left(\frac{2x-1}{1+x-x^2}\right) dx$ is

(a) 1 (b) 0 (c) – 1 (d) $\frac{\pi}{4}$

41. If $\int \cos^n x \sin x \, dx = -\frac{\cos^6 x}{6} + C$, then n =

(a) 0 (b) 1 (c) 2 (d) 5

42. If $\int \frac{3x+1}{(x-3)(x-5)} dx = \int \frac{-5}{(x-3)} dx + \int \frac{B}{(x-5)} dx$, then the value of B is

(a) 3 (b) 4 (c) 6 (d) 8

43. If $\int \frac{dx}{\sqrt{a^2-x^2}} = \sin^{-1}\frac{x}{3} + c$, then a =

(a) 3 (b) 4 (c) 6 (d) 8

44. If $\int \frac{e^x + e^{-x}}{e^x - e^{-x}} dx = \log(e^{2x} - 1) - Ax + C$, then A =

(a) 0 (b) 1 (c) 2 (d) 5