

Integrals

Question 1.

$$\int_1^2 x^2 dx$$

- (a) 1
- (b) $\frac{7}{3}$
- (c) $\frac{1}{3}$
- (d) 0

Answer:

- (b) $\frac{7}{3}$

Question 2.

$$\int_0^2 (x^2 + 3) dx$$

- (a) $\frac{25}{3}$
- (b) $\frac{26}{3}$
- (c) $\frac{24}{3}$
- (d) None of these

Answer:

- (b) $\frac{26}{3}$

Question 3.

$$\text{Evaluate: } \int_0^{\pi/4} \sqrt{1 - \sin 2x} dx$$

- (a) $\sqrt{2} - 1$
- (b) $\sqrt{2} + 1$
- (c) $\sqrt{2}$
- (d) None of these

Answer:

- (a) $\sqrt{2} - 1$

Question 4.

Evaluate: $\int_0^{2\pi} \sin\left(\frac{\pi}{4} + \frac{x}{2}\right) dx$

- (a) $-2\sqrt{2}$
- (b) -2
- (c) $\sqrt{2}$
- (d) $2\sqrt{2}$

Answer:

- (d) $2\sqrt{2}$

Question 5.

Evaluate: $\int_1^2 \frac{dx}{x^2}$

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

Answer:

- (a) $\frac{1}{2}$

Question 6.

Evaluate: $\int_0^1 \sin^{-1}\left(\frac{2x}{1+x^2}\right) dx$

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

Answer:

- (a) $\frac{\pi}{2} - \log 2$

Question 7.

Evaluate : $\int_0^{\pi/2} \frac{\cos \theta}{(1 + \sin \theta)(2 + \sin \theta)} d\theta$

- (a) $\log\left(\frac{4}{3}\right)$
- (b) $\log\left(\frac{3}{4}\right)$
- (c) $\log 4 + \log 3$
- (d) None of these

Answer:

- (a) $\log\left(\frac{4}{3}\right)$

Question 8.

Evaluate : $\int_0^1 \frac{x \tan^{-1} x}{(1+x^2)^{3/2}} dx$

- (a) $\frac{4-\pi}{2\sqrt{2}}$ (b) $\frac{4+\pi}{2\sqrt{2}}$
(c) $\frac{4-\pi}{4\sqrt{2}}$ (d) None of these

Answer:

(c) $\frac{4-\pi}{4\sqrt{2}}$

Question 9.

Evaluate : $\int_0^{\pi/2} \frac{1}{3+2\cos x} dx$

- (a) $\sqrt{5} \tan^{-1}\left(\frac{1}{\sqrt{5}}\right)$ (b) $\frac{\sqrt{5}}{2} \tan^{-1}\left(\frac{1}{\sqrt{5}}\right)$
(c) $\frac{2}{\sqrt{5}} \tan^{-1}\left(\frac{1}{\sqrt{5}}\right)$ (d) $-\frac{2}{\sqrt{5}} \tan^{-1}\left(\frac{1}{\sqrt{5}}\right)$

Answer:

(c) $\frac{2}{\sqrt{5}} \tan^{-1}\left(\frac{1}{\sqrt{5}}\right)$

Question 10.

Evaluate : $\int_0^{\pi/2} \frac{1}{2\cos x + 4\sin x} dx$

- (a) $\sqrt{5} \log\left(\frac{3+\sqrt{5}}{2}\right)$ (b) $\frac{1}{\sqrt{55}} \log\left(\frac{3-\sqrt{5}}{2}\right)$
(c) $\frac{1}{\sqrt{5}} \log\left(\frac{3+\sqrt{5}}{2}\right)$ (d) None of these

Answer:

(c) $\frac{1}{\sqrt{5}} \log\left(\frac{3+\sqrt{5}}{2}\right)$

Question 11.

Evaluate: $\int (2\tan x - 3\cot x)^2 dx$

(a) $-4\tan x - 9\cot x - 25x + C$

(b) $4\tan x - 9\cot x - 25x + C$

(c) $-4\tan x + 9\cot x + 25x + C$

(d) $4\tan x + 9\cot x + 25x + C$

Answer:

(b) $4\tan x - 9\cot x - 25x + C$

Question 12.

Evaluate : $\int (e^{x \log a} + e^{a \log x} + e^{\log a}) dx$

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

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

(c) $\frac{a^x}{\log a} + \frac{x^a}{a+1} + ax^a + C$

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

Answer:

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

Question 13.

Evaluate : $\int [\sec^2(7-4x)] dx$

(a) $-\frac{1}{4} \tan(7-4x) + C$

(b) $\frac{1}{4} \tan(7-4x) + C$

(c) $\frac{1}{4} \tan(7+4x) + C$

(d) $-\frac{1}{4} \tan(7x-4) + C$

Answer:

(a) $-\frac{1}{4} \tan(7-4x) + C$

Question 14.

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

Answer:

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

Question 15.

Evaluate : $\int \cos^3 x e^{\log \sin x} dx = \int \cos^3 x \sin x dx$

- (a) $\frac{\cos^4 x}{4} + C$ (b) $-\frac{\cos^4 x}{4} + C$
(c) $\frac{\cos^4 x}{4x} + C$ (d) None of these

Answer:

(b) $-\frac{\cos^4 x}{4} + C$

Question 16.

$\int \frac{\cot x}{\sqrt[3]{\sin x}} dx =$

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

Answer:

(a) $\frac{-3}{\sqrt[3]{\sin x}} + C$

Question 17.

Evaluate: $\int \tan(x - \theta) \tan(x + \theta) \tan 2x dx$

- (a) $\frac{1}{2} \log|\cos 2x| - \log|\cos(x - \theta)| + \log|\cos(x + \theta)| + C$
 (b) $-\frac{1}{2} \log|\cos 2x| + \log|\cos(x - \theta)| + \log|\cos(x + \theta)| + C$
 (c) $-\frac{1}{2} \log|\cos 2x| - \log|\cos(x - \theta)| - \log|\cos(x + \theta)| + C$
 (d) None of these

Answer:

(b) $-\frac{1}{2} \log|\cos 2x| + \log|\cos(x - \theta)| + \log|\cos(x + \theta)| + C$

Question 18.

Evaluate : $\int \frac{1}{\sqrt{\sin^3 x \cos^5 x}} dx$

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

Answer:

(b) $-\frac{2}{\sqrt{\tan x}} + \frac{2}{3}(\tan x)^{3/2} + C$

Question 19.

Evaluate : $\int \sec^{4/3} x \operatorname{cosec}^{8/3} x dx$

- (a) $\frac{3}{5} \tan^{-5/3} x - 3 \tan^{1/3} x + C$
 (b) $-\frac{3}{5} \tan^{-5/3} x + 3 \tan^{1/3} x + C$
 (c) $-\frac{3}{5} \tan^{-5/3} x - 3 \tan^{1/3} x + C$
 (d) None of these

Answer:

(b) $-\frac{3}{5} \tan^{-5/3} x + 3 \tan^{1/3} x + C$

Question 20.

Evaluate : $\int \frac{x^3 + x}{x^4 - 9} dx$

(a) $\frac{1}{4} \log|x^4 - 9| + \frac{1}{12} \log \left| \frac{x^2 + 3}{x^2 - 3} \right| + C$

(b) $\frac{1}{4} \log|x^4 - 9| - \frac{1}{12} \log \left| \frac{x^2 - 3}{x^2 + 3} \right| + C$

(c) $\frac{1}{4} \log|x^4 - 9| + \frac{1}{12} \log \left| \frac{x^2 - 3}{x^2 + 3} \right| + C$

(d) None of these

Answer:

(c) $\frac{1}{4} \log|x^4 - 9| - \frac{1}{12} \log \left| \frac{x^2 - 3}{x^2 + 3} \right| + C$

Question 21.

Evaluate : $I = \int_0^{\pi/2} \frac{\sin 2x}{\sin^4 x + \cos^4 x} dx$

(a) $\frac{\pi}{2}$

(b) $\frac{\pi}{4}$

(c) $\frac{\pi}{3}$

(d) None of these

Answer:

(a) $\frac{\pi}{2}$

Question 22.

Evaluate : $\int_0^{\pi/2} \sqrt{\cos \theta} \sin^3 \theta d\theta$

(a) $\frac{8}{21}$

(b) $\frac{7}{21}$

(c) $\frac{8}{23}$

(d) $\frac{7}{23}$

Answer:

(a) $\frac{8}{21}$

Question 23.

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) $3 - \sqrt{3}$

Answer:

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

Question 24.

If $A = \int_0^{\pi} \frac{\cos x}{(x+2)^2} dx$, **then** $\int_0^{\pi/2} \frac{\sin 2x}{(x+1)} dx$ **is equal to**

- (a) $A - \frac{1}{2} - \frac{1}{\pi+2}$ (b) $\frac{1}{2} + \frac{1}{\pi+2} - A$
(c) $\frac{1}{\pi+2} - A$ (d) $1 + \frac{1}{\pi+2} - A$

Answer:

- (b) $\frac{1}{2} + \frac{1}{\pi+2} - A$

Question 25.

The value of $\int_{-\pi/2}^{\pi/2} \frac{dx}{e^{\sin x} + 1}$ **is equal to**

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

Answer:

- (d) $\frac{\pi}{2}$

Question 26.

The value of $\int_0^{2\pi} \frac{x \sin^{2n} x}{\sin^{2n} x + \cos^{2n} x} dx$ **is**

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

Answer:

(c) π^2

Question 27.

$\int \frac{dx}{\sin(x-a)\sin(x-b)}$ is equal to

(a) $\sin(b-a) \log \left| \frac{\sin(x-b)}{\sin(x-a)} \right| + C$

(b) $\operatorname{cosec}(b-a) \log \left| \frac{\sin(x-a)}{\sin(x-b)} \right| + C$

(c) $\operatorname{cosec}(b-a) \log \left| \frac{\sin(x-b)}{\sin(x-a)} \right| + C$

(d) $\sin(b-a) \log \left| \frac{\sin(x-a)}{\sin(x-b)} \right| + C$

Answer:

(c) $\operatorname{cosec}(b-a) \log \left| \frac{\sin(x-b)}{\sin(x-a)} \right| + C$

Question 28.

$\int e^x \left(\frac{1-x}{1+x^2} \right)^2 dx$ is equal to

(a) $\frac{e^x}{1+x^2} + C$

(b) $\frac{-e^x}{1+x^2} + C$

(c) $\frac{e^x}{(1+x^2)^2} + C$

(d) $\frac{-e^x}{(1+x^2)^2} + C$

Answer:

(a) $\frac{e^x}{1+x^2} + C$

Question 29.

$\int \frac{x^3}{x+1}$ is equal to

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

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

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

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

Answer:

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

Question 30.

If $\int \frac{x^3 dx}{\sqrt{1+x^2}} = a(1+x^2)^{3/2} + b\sqrt{1+x^2} + C$, then

(a) $a = \frac{1}{3}, b = 1$

(b) $a = \frac{-1}{3}, b = 1$

(c) $a = \frac{-1}{3}, b = -1$

(d) $a = \frac{1}{3}, b = -1$

Answer:

(d) $a = \frac{1}{3}, b = -1$

Question 31.

$\int_{-\pi/4}^{\pi/4} \frac{dx}{1+\cos 2x}$ is equal to

(a) 1

(b) 2

(c) 3

(d) 4

Answer:

(a) 1

Question 32.

Evaluate : $\int \frac{1}{\sqrt{1-e^{2x}}} dx$

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

Answer:

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

Question 33.

Evaluate : $\int \frac{1}{x(x^n + 1)} dx$

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

Answer:

(b) $\frac{1}{n} \log \left| \frac{x^n}{x^n + 1} \right| + C$

Question 34.

Evaluate : $\int \frac{1}{1 + 3\sin^2 x + 8\cos^2 x} dx$

- (a) $\frac{1}{6} \tan^{-1}(2 \tan x) + C$ (b) $\tan^{-1}(2 \tan x) + C$
(c) $\frac{1}{6} \tan^{-1} \left(\frac{2 \tan x}{3} \right) + C$ (d) None of these

Answer:

(c) $\frac{1}{6} \tan^{-1} \left(\frac{2 \tan x}{3} \right) + C$

Question 35.

The value of $\int \frac{dx}{\sqrt{x} + \sqrt[3]{x}}$ is

- (a) $3\sqrt{x} + 3(\sqrt[3]{x}) - 6\sqrt[6]{x} + \log(\sqrt[6]{x} + 1) + C$
(b) $2\sqrt{x} + 6(\sqrt[6]{x}) - 6\log(\sqrt[6]{x} + 1) + C$
(c) $2\sqrt{x} - 3(\sqrt[3]{x}) + 6(\sqrt[6]{x}) - 6\log(\sqrt[6]{x} + 1) + C$
(d) None of these

Answer:

(c) $2\sqrt{x} - 3(\sqrt[3]{x}) + 6(\sqrt[6]{x}) - 6\log(\sqrt[6]{x} + 1) + C$

Question 36.

Evaluate : $\int \frac{\tan \theta + \tan^3 \theta}{1 + \tan^3 \theta} d\theta$

- (a) $-\frac{1}{3} \log|1 + \tan \theta| - \frac{1}{6} \log|\tan^2 \theta - \tan \theta + 1|$
 $-\frac{1}{\sqrt{3}} \tan^{-1} \left(\frac{2 \tan \theta - 1}{\sqrt{3}} \right) + C$
(b) $-\frac{1}{3} \log|1 + \tan \theta| + \frac{1}{6} \log|\tan^2 \theta - \tan \theta + 1|$
 $+\frac{1}{\sqrt{3}} \tan^{-1} \left(\frac{2 \tan \theta - 1}{\sqrt{3}} \right) + C$
(c) $-\frac{1}{3} \log|1 + \tan \theta| + \frac{1}{6} \log|\tan^2 \theta + \tan \theta + 1|$
 $-\frac{1}{\sqrt{3}} \tan^{-1} \left(\frac{2 \tan \theta + 1}{\sqrt{3}} \right) + C$
(d) None of these

Answer:

$$-\frac{1}{3}\log|1+\tan\theta|+\frac{1}{6}\log|\tan^2\theta-\tan\theta+1|$$

(b) $+\frac{1}{\sqrt{3}}\tan^{-1}\left(\frac{2\tan\theta-1}{\sqrt{3}}\right)+C$

Question 37.

Evaluate : $\int \frac{1-\cos x}{\cos x(1+\cos x)} dx$

(a) $\log|\sec x + \tan x| - 2\tan(x/2) + C$

(b) $\log|\sec x - \tan x| - 2\tan(x/2) + C$

(c) $\log|\sec x + \tan x| + 2\tan(x/2) + C$

(d) None of these

Answer:

(a) $\log|\sec x + \tan x| - 2\tan(x/2) + C$

Question 38.

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) $\log \frac{x}{2}$

Answer:

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

Question 39.

$\int \frac{\cos x - 1}{\sin x + 1} e^x dx$ is equal to

(a) $\frac{e^x \cos x}{1 + \sin x} + C$ (b) $-\frac{e^x \sin x}{1 + \sin x} + C$

(c) $\frac{e^x}{x+4} + C$ (d) $-\frac{e^x \cos x}{1 + \sin x} + C$

Answer:

(a) $\frac{e^x \cos x}{1 + \sin x} + C$

Question 40.

$\int \left(\frac{x+2}{x+4} \right)^2 e^x dx$ is equal to

(a) $e^x \left(\frac{x}{x+4} \right) + C$

(b) $e^x \left(\frac{x+2}{x+4} \right) + C$

(c) $e^x \left(\frac{x-2}{x+4} \right) + C$

(d) $\left(\frac{2xe^x}{x+4} \right) + C$

Answer:

(b) $e^x \left(\frac{x+2}{x+4} \right) + C$

Question 41.

Evaluate : $\int \sqrt{x^2 + 2x + 5} dx$

(a) $-\frac{1}{2}(x+1)\sqrt{x^2 + 2x + 5}$

$+ 2 \log \left| (x+1) + \sqrt{x^2 + 2x + 5} \right| + C$

(b) $\frac{1}{2}(x+1)\sqrt{x^2 + 2x + 5}$

$+ 2 \log \left| (x+1) + \sqrt{x^2 + 2x + 5} \right| + C$

(c) $-\frac{1}{2}(x+1)\sqrt{x^2 + 2x + 5}$

$- 2 \log \left| (x+1) + \sqrt{x^2 + 2x + 5} \right| + C$

(d) None of these

Answer:

(b) $\frac{1}{2}(x+1)\sqrt{x^2 + 2x + 5}$

$+ 2 \log \left| (x+1) + \sqrt{x^2 + 2x + 5} \right| + C$