

# 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)  $\pi$
- (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 :**  $I = \int_0^{\pi/2} \frac{\sin 2x}{\sin^4 x + \cos^4 x}$

(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**  $\int_{-\pi/2}^{\pi/2} \frac{dx}{\sin x + 1}$  **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)  $\pi^2$                       (d)  $2\pi^2$



Answer:

(c)  $\pi^2$

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