SESSION : 2025-26

DPP
DAILY PRACTICE PROBLEMS

CLASS : XIIth **SUBJECT : MATHS**
DATE : **DPP NO. :1**

Topic :-INTEGRALS

1. Let $f(x) = \int_0^x |x-2|dx, x \geq 0$. Then, $f'(x)$ is
   a) Continuous and non differentiable at $x = 2$
   b) Discontinuous at $x = 4$
   c) Neither continuous nor differentiable at $x = 2$
   d) Non-differentiable at $x = 4$

2. If $f(t)$ is an odd function, then $\int_0^x f(t)dt$ is
   a) An odd function b) An even function
   c) Neither even nor odd d) 0

3. $\int \frac{sec sec\, x\, cosec\, x}{2cotcot\, x - secsec\, x\, cosec\, x}\, dx$ is equal to
   a) $log\, log\, |sec\, sec\, x + tan\, tan\, x| + c$ b) $log\, log\, |sec\, sec\, x + cosec\, x| + c$
   c) $\frac{1}{2}\, log\, log\, |sec\, sec\, 2x + tan\, tan\, 2x| + c$ d) $log\, log\, |sec\, sec\, 2x + cosec\, 2x| + c$

4. $\int_0^{\pi} \frac{\theta sin sin\, \theta}{1+\theta} d\theta$ is equal to
   a) $\frac{\pi^2}{2}$ b) $\frac{\pi^3}{3}$ c) π^2 d) $\frac{\pi^2}{4}$

5. The value of $\left[\int_0^{\theta} \sqrt{\phi}\, d\phi + \int_0^{\theta} \sqrt{\phi}\, d\phi\right]$ is equal to
   a) π b) $\frac{\pi}{2}$ c) $\frac{\pi}{3}$ d) $\frac{\pi}{4}$

6. $\int_0^{\pi/2} \frac{dx}{1+x}$ is equal to
   a) π b) $\frac{\pi}{2}$ c) $\frac{\pi}{4}$ d) $\frac{3\pi}{2}$

7. Let $I = \int_0^1 \frac{sin sin\, x}{\sqrt{x}}\, dx and\, J = \int_0^1 \frac{cos cos\, x}{\sqrt{x}}\, dx$. Then, which one of the following is true?
   a) $I > \frac{2}{3} and\, J < 2$ b) $I > \frac{2}{3} and\, J > 2$ c) $I < \frac{2}{3} and\, J < 2$ d) $I < \frac{2}{3} and\, J > 2$

8. If $f(x) = \{|x|, |x-2|, -1 \leq x \leq 1\ 1 < x \leq 3'$ then $\int_{-1}^3 f(x)dx$ is equal to
   a) 0 b) 1 c) 2 d) 4

9. $\int \frac{1}{x\,(x^n+1)}\, dx$ is equal to
   a) $\frac{1}{n}\, log\, log\, \left(\frac{x^n}{x^n+1}\right) + C$ b) $\frac{1}{n}\, log\, log\, \left(\frac{x^n+1}{x^n}\right)$ c) $log\, log\, \left(\frac{x^n}{x^n+1}\right) + C$ d) None of these

10. $\int_0^{1/2} |sin sin\, \pi x|dx$ is equal to
    a) 0 b) π c) $-\pi$ d) $1/\pi$

11. The value of the integral $\int_0^{\pi} \frac{1}{a^2 - 2acoscos\, x + 1} dx (a > 1)$, is
    a) $\frac{\pi}{1-a^2}$ b) $\frac{\pi}{a^2-1}$ c) $\frac{2\pi}{a^2-1}$ d) $\frac{2\pi}{1-a^2}$

12. If $I = \int_0^1 \sqrt{1+x^3}\,dx$ then

a) $I > 2$ b) $I \neq \frac{\sqrt{5}}{2}$ c) $I > \frac{\sqrt{7}}{2}$ d) None of these

13. Assuming that f is everywhere continuous, $\frac{1}{c}\int_{ac}^{bc} f\left(\frac{x}{c}\right)dx$ is equal to

a) $\frac{1}{c}\int_a^b f(x)dx$ b) $\int_a^b f(x)dx$ c) $c\int_a^b f(x)dx$ d) $\int_{ac^2}^{bc^2} f(x)dx$

14. The value of the integral $\int e^x\left(\frac{1-x}{1+x}\right)^2 dx$ is

a) $e^x\left(\frac{1-x}{1+x^2}\right)+c$ b) $e^x\left(\frac{1+x}{1+x^2}\right)+c$ c) $\frac{e^x}{1+x^2}+c$ d) $e^x(1-x)+c$

15. Let $\frac{d}{dx}\big(F(x)\big) = \frac{e^{sinsin\,x}}{x}, x > 0$. If $\int_1^4 \frac{3}{x}e^{sinsin\,x^3}\,dx = F(k) - f(1)$, then one of the possible values of k, is

a) 64 b) 15 c) 16 d) 63

16. The values of 'a' for which $\int_0^a (3x^2+4x-5)dx < a^3 - 2$ are

a) $\frac{1}{2} < a < 2$ b) $\frac{1}{2} \leq a \leq 2$ c) $a \leq \frac{1}{2}$ d) $a \geq 2$

17. The value of the integral $\int \frac{log\,log\,(x+1) - log\,log\,x}{x(x+1)}dx$ is

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

b) $-[\{log\ log\ (x+1)\ \}^2 - (log\ log\ x\ )^2] + log\ log\ (x+1)\ \cdot log\ log\ x\ + C$

c) $\frac{1}{2}[log\ log\ (1+1/x)\ ]^2 + C$

d) None of these

18. The value of $\int_0^{2\pi} [2\ sin\ sin\ x]\,dx$, where $[\cdot]$ represents the greatest integral functions, is

a) $-\frac{5\pi}{3}$ b) $-\pi$ c) $\frac{5\pi}{3}$ d) -2π

19. $\int_0^1 \frac{d}{dx}\left[\left(\frac{2x}{1+x^2}\right)\right]dx$ is equal to

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

20. Let $f(x)$ be a function satisfying $f'(x) = f(x)$ with $f(0) = 1$ and $g(x)$ be a function that satisfies $f(x) + g(x) = x^2$. Then, the value of the integral $\int_0^1 f(x)g(x)dx$, is

a) $e - \frac{e^2}{2} - \frac{5}{2}$ b) $e + \frac{e^2}{2} - \frac{3}{2}$ c) $e - \frac{e^2}{2} - \frac{3}{2}$ d) $e + \frac{e^2}{2} + \frac{5}{2}$

SESSION : 2025-26

DPP
DAILY PRACTICE PROBLEMS

CLASS : XIIth **SUBJECT : MATHS**
DATE : **DPP NO. :2**

Topic :-INTEGRALS

1. The value of the integral $\int_0^{\pi} \; log\, log\, (1+cos\, cos\, x)\, dx$ is
   a) $\frac{\pi}{2} log\, log\, 2$ b) $-\pi\, log\, log\, 2$ c) $\pi\, log\, log\, 2$ d) None of these

2. $\int \; e^x \left(\frac{1+x+x^2}{1+x^2}\right) dx$ is equal to
   a) $x\, e^x + C$ b) $x^2 e^x + C$ c) $\frac{1}{x} e^x + C$ d) None of these

3. Let $I_1 = \int_a^{\pi-a} \; xf(sin\, sin\, x)\, dx, I_2 = \int_a^{\pi-a} \; f\,(sin\, sin\, x)\, dx,$ then I_2 is equal to
   a) $\frac{\pi}{2} I_1$ b) πI_1 c) $\frac{2}{\pi} I_1$ d) $2I_1$

4. $\int \; \left(\frac{1}{x}\right) dx$ equals
   a) $xx + x + c$ b) $xx - x + c$
   c) $xx - x + c$ d) None of these

5. The value of $\int_0^1 \; \frac{dx}{x+\sqrt{1-x^2}}$ is
   a) $\frac{\pi}{3}$ b) $\frac{\pi}{2}$ c) $\frac{1}{2}$ d) $\frac{\pi}{4}$

6. For any natural number n, the value of the integral $\int_0^{\sqrt{n}} \; [x^2] dx$, is
   a) $n\sqrt{n} + \sum_{r=1}^{n} \; \sqrt{r}$ b) $n\sqrt{n} - \sum_{r=1}^{n} \; \sqrt{r}$ c) $\sum_{r=1}^{n} \; \sqrt{r} - n\sqrt{n}$ d) None of these

7. $\int \; \frac{1}{x}(e)dx$ is equal to
   a) $(1-x) + c$ b) $(ex - 1) + c$
   c) $(x - 1) + c$ d) $(1 + x) + c$

8. Let f be integrable over $[0, a]$ for any real a.If we define

$$I_1 = \int_0^{\pi/2} \; cos\, cos\, \theta f(sin\, sin\, \theta + \theta)\, d\theta$$

and$I_2 = \int_0^{\pi/2} \; sin\, sin\, 2\theta f(sin\, sin\, \theta + \theta)\, d\theta,$ then
   a) $I_1 = I_2$ b) $I_1 = -I_2$ c) $I_1 = 2I_2$ d) $I_1 = -2I_2$

9. Consider the following statements:
1.$\int_{-\pi/2}^{\pi/2} \; \sqrt{cos\, cos\, x - x}\; dx = \frac{3}{4}$
2.$\int_0^4 \; (|x-1| + |x-3|) dx = 10$
Which of these is/are correct?
   a) Only (1) b) Only (2) c) Both of these d) None of these

10. The value of the integral $\int_{\frac{-\pi}{4}}^{\frac{\pi}{4}} \; x\, dx$ is
   a) $-\frac{8}{3}$ b) $\frac{3}{2}$ c) $\frac{8}{3}$ d) None of these

11. The value of $\frac{\left(\int_0^x \; e^x\, dx\right)^2}{\int_0^x \; e^{2x^3}\, dx}$, is
   a) 1 b) 2 c) 3 d) 0

12. If $\int_{}^{1} t^2 f(t)dt = 1 - sin\ sin\ x\ \ \forall\ x \in [0\ \frac{\pi}{}]$ then $f\left(\frac{1}{}\right)$ is

a) 3 b) $\sqrt{3}$ c) $\frac{1}{3}$ d) None of these

13. If a is fixed real number such that $f(a-x)+f(a+x)=0$, then $\int_0^{2a} f(x)dx =$

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

14. $\int \frac{dx}{sinsin\,(x-a)sinsin\,(x-b)}$ is

a) $\frac{1}{sinsin\,(a-b)}\ log\ log\ \left|\frac{sinsin\,(x-a)}{sin(x-b)}\right| + c$

b) $\frac{-1}{sinsin\,(a-b)}\ log\ log\ \left|\frac{sinsin\,(x-a)}{sinsin\,(x-b)}\right| + c$

c) $log\ log\ \ sin\ sin\,(x-a)\ sin\ sin\,(x-b) + c$

d) $log\ log\ \left|\frac{sinsin\,(x-a)}{sinsin\,(x-b)}\right| + c$

15. Let $\int \sqrt{\frac{5-x}{2+x}}dx$ equal

a) $\sqrt{x+2}\sqrt{5-x} + 3\sqrt{\frac{x+2}{3}} + C$

b) $\sqrt{x+2}\sqrt{5-x} + 7\sqrt{\frac{x+2}{7}} + C$

c) $\sqrt{x+2}\sqrt{5-x} + 5\sqrt{\frac{x+2}{5}} + C$

d) None of these

16. $\int \frac{2x^2+3}{(x^2-1)(x^2+4)}dx = a\ log\ log\ \left(\frac{x+1}{x-1}\right) + b\frac{x}{2}$, then (a,b) is

a) $(-1/2, 1/2)$ b) $(1/2, 1/2)$ c) $(-1, 1)$ d) $(1, -1)$

17. $\int e^x \frac{(x-1)}{x^2}\ dx$ is equal to

a) $\frac{e^x}{x^2} + c$ b) $\frac{-e^x}{x^2} + c$ c) $\frac{e^x}{x} + c$ d) $\frac{-e^x}{x} + c$

18. The value of the integral $\int_0^{3\alpha} cosec(x-\alpha)cosec(x-2\alpha)dx$, is

a) $2\ sec\ sec\ \alpha\ log\ log\ \left(\frac{1}{2}cosec\ \alpha\right)$ b) $2\ sec\ sec\ \alpha\ log\ log\ \left(\frac{1}{2}sec\ sec\ \alpha\right)$ c) $2\ cosec\ \alpha\ log\ log\ (sec\ sec\ \alpha)$ d) $2\ cosec\ \alpha\ log\ log\ \left(\frac{1}{2}sec\ sec\ \alpha\right)$

19. $\int_0^3 \frac{3x+1}{x^2+9}\ dx$ is equal to

a) $log\ log\ (2\sqrt{2}) + \frac{\pi}{12}$ b) $log\ log\ \left(2\sqrt{2}\right) + \frac{\pi}{2}$ c) $log\ log\ \left(2\sqrt{2}\right) + \frac{\pi}{6}$ d) $log\ log\ \left(2\sqrt{2}\right) + \frac{\pi}{3}$

20. $\int \frac{dx}{\sqrt{(1-x)(x-2)}}$ is equal to

a) $(2x-3)+c$ b) $(2x+5)+c$ c) $(3-2x)+c$ d) $(5-2x)+c$

SESSION : 2025-26

DPP
DAILY PRACTICE PROBLEMS

CLASS : XIIth **SUBJECT : MATHS**

DATE : **DPP NO. :3**

Topic :-INTEGRALS

1. If $f(x) = [2x + 4x^3 + \ldots + 2nx^{2n-1}](0 < x < 1)$, then $\int f(x)dx$ is equal to
   a) $-\sqrt{1-x^2}$ b) $\frac{1}{\sqrt{1-x^2}}$ c) $\frac{1}{x^2-1}$ d) $\frac{1}{1-x^2}$

2. $\int \frac{dx}{sinsin\, x - coscos\, x + \sqrt{2}}$ equals
   a) $-\frac{1}{\sqrt{2}}\, tan\, tan\left(\frac{x}{2} + \frac{\pi}{8}\right) + c$ b) $\frac{1}{\sqrt{2}}\, tan\, tan\left(\frac{x}{2} + \frac{\pi}{8}\right) + c$ c) $\frac{1}{\sqrt{2}}\, cot\, cot\left(\frac{x}{2} + \frac{\pi}{8}\right) + c$ d) $-\frac{1}{\sqrt{2}}\, cot\, cot\left(\frac{x}{2} + \frac{\pi}{8}\right) + c$

3. $\int_0^{\frac{\pi}{2}} \frac{coscos\, x}{1 + sinsin\, x}\, dx$ is equal to
   a) $log\, log\, 2$ b) $2\, log\, log\, 2$ c) $(log\, log\, 2)^2$ d) $\frac{1}{2}\, log\, log\, 2$

4. The integral $\int_0^1 \frac{2^{\frac{x}{2}}}{x} dx$ equals
   a) $\int_0^{\pi/6} \frac{x}{tantan\, x} dx$ b) $\int_0^{\pi/6} \frac{2x}{tantan\, x} dx$ c) $\int_0^{\pi/2} \frac{2x}{tantan\, x} dx$ d) $\int_0^{\pi/6} \frac{x}{sinsin\, x} dx$

5. If $\int_2^e \left(\frac{1}{loglog\, x} - \frac{1}{(loglog\, x)^2}\right) dx = a + \frac{b}{loglog\, 2}$, then
   a) $a = e, b = -2$ b) $a = e, b = 2$ c) $a = -e, b = 2$ d) None of these

6. The value of $\int_0^8 |x - 5|\, dx$ is
   a) 17 b) 12 c) 9 d) 18

7. $\int_0^1 \frac{x\, dx}{[x + \sqrt{1-x^2}]\sqrt{1-x^2}}$ is equal to
   a) 0 b) 1 c) $\frac{\pi}{4}$ d) $\frac{\pi^2}{2}$

8. $\int_0^1 (1 - x + x^2)\ dx$ is equal to

a) $\pi - log\ log\ 2$ b) $\pi + log\ log\ 2$ c) $\frac{\pi}{2} + log\ log\ 2$ d) $\frac{\pi}{2} - log\ log\ 2$

9. $\int_8^{15} \frac{dx}{(x-3)\sqrt{x+1}}$ is equal to

a) $\frac{1}{2}\ log\ log\ \frac{5}{3}$ b) $\frac{1}{3}\ log\ log\ \frac{5}{3}$ c) $\frac{1}{2}\ log\ log\ \frac{3}{5}$ d) $\frac{1}{5}\ log\ log\ \frac{3}{5}$

10. $\int \{1 + 2\ tan\ tan\ x\ (tan\ tan\ x\ + sec\ sec\ x\ )\}^{1/2} dx$ is equal to

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

b) $log\ log\ cosec(sec\ sec\ x\ + tan\ tan\ x\ ) + C$

c) $log\ log\ \ sec\ sec\ x\ \ (sec\ sec\ x\ + tan\ tan\ x\ + C)$

d) $log\ log\ (sec\ sec\ x\ + tan\ tan\ x\ ) + C$

11. If $I_1 = \int_0^\infty \frac{1}{1+x^4}\,dx$ and $I_2 = \int_0^\infty \frac{x^2}{1+x^4}\,dx$. Then $\frac{I_1}{I_2} =$

a) 1 b) 2 c) $1/2$ d) None of these

12. $\int \frac{sin\,sin\,x\,dx}{3+4x}$ is equal to

a) $log\ log\ (3+4x)+c$ b) $\frac{1}{2\sqrt{3}}\left(\frac{cos\,cos\,x}{\sqrt{3}}\right)+c$

c) $-\frac{1}{2\sqrt{3}}\left(\frac{x}{\sqrt{3}}\right)+c$ d) $\frac{1}{2\sqrt{3}}\left(\frac{x}{\sqrt{3}}\right)+c$

13. For any integer n, the integral $\int_0^\pi e^x\,(2n+1)x\,dx$ has the value

a) π b) 1 c) 0 d) None of these

14. If $\frac{d}{dx}\{f(x) = \frac{1}{1+x^2}$, then $\frac{d}{dx}\{f(x^3)\}$ is

a) $\frac{3x}{1+x^3}$ b) $\frac{3x^2}{1+x^6}$ c) $\frac{-6x^5}{(1+x^6)^2}$ d) $\frac{-6x^5}{1+x^6}$

15. $\int_0^\pi [cot\ cot\ x]\,dx$, [.]denotes the greatest integer function, is equal to

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

16. $\int_{-3}^{2} \{|x+1|+|x+2|+|x-1|\}dx$ is equal to

a) $\frac{31}{2}$ b) $\frac{35}{2}$ c) $\frac{47}{2}$ d) $\frac{39}{2}$

17. $\int_0^3 |x^3+x^2+3x|dx$ is equal to

a) $\frac{171}{2}$ b) $\frac{171}{4}$ c) $\frac{170}{4}$ d) $\frac{170}{3}$

18. $\int \frac{dx}{sin\,sin\,x\,cos\,cos\,x}$ is equal to

a) $log\ log\ |\ sin\ sin\ x|+c$ b) $log\ log\ |\ tan\ tan\ x|+c$ c) $log\ log\ |\ sec\ sec\ x|+c$ d) None of these

19. $\int_0^{2n\pi} \left\{|\ sin\ sin\ x| - \left|\frac{1}{2}\ sin\ sin\ x\ \right|\right\} dx$ equals

a) n b) $2n$ c) $-2n$ d) None of these

20. If $\int_a^b x^3\,dx = 0$ and if $\int_a^b x^2\,dx = \frac{2}{3}$, then the values of $a\ and\ b$ are respectively

a) 1,1 b) $-1,-1$ c) $1,-1$ d) $-1,1$

SESSION : 2025-26

DPP
DAILY PRACTICE PROBLEMS

CLASS : XIIth **SUBJECT : MATHS**
DATE : **DPP NO. :4**

Topic :-INTEGRALS

1. The value of $\int_0^{\pi/2} \text{cosec}\,(x-\pi/3)\,\text{cosec}(x-\pi/6)dx$, is
   a) $2\log 3$ b) $-2\log 3$ c) $\log 3$ d) None of these

2. The primitive function of the function $f(x)=\frac{\sqrt{(a^2-x^2)}}{x^4}$ is
   a) $c+\frac{\sqrt{a^2-x^2}}{3a^2x^3}$ b) $c-\frac{(a^2-x^2)^{3/2}}{2a^2x^2}$ c) $c-\frac{(a^2-x^2)^{3/2}}{3a^2x^3}$ d) None of these

3. If $f(x)=\begin{cases} x, & \text{for } x<1 \\ x-1, & \text{for } x\geq 1 \end{cases}$, then $\int_0^2 x^2 f(x)dx$ is equal to
   a) 1 b) $\frac{4}{3}$ c) $\frac{5}{3}$ d) $\frac{5}{2}$

4. $\int \frac{x^2+x-6}{(x-2)(x-1)}dx$
   a) $x+2\log(x-1)+c$ b) $2x+2\log(x-1)+c$ c) $x+4\log(1-x)+c$
   d) $x+4\log(x-1)+c$

5. $\int \frac{x^3}{(1+x^2)^{1/3}}dx$ is equal to
   a) $\frac{20}{3}(1+x^2)^{2/3}(2x^2-3)+C$
   b) $\frac{3}{20}(1+x^2)^{2/3}(2x^2-3)+C$
   c) $\frac{3}{20}(1+x^2)^{2/3}(2x^2+3)+C$
   d) None of these

6. The equation $\int_{-\pi/4}^{\pi/4}\left\{a|\sin x|+\frac{b\sin x}{1+\cos x}+c\right\}dx=0$, where a, b, c are constants, gives a relation between
   a) $a, b$and c b) a and c c) a and b d) b and c

7. The value of $\int_2^4\{|x-2|+|x-3|\}dx$ is
   a) 1 b) 2 c) 3 d) 5

8. If $g(x)=\int_0^x \cos^4 t\,dt$, then $g(x+\pi)$ equals
   a) $g(x)+g(\pi)$ b) $g(x)-g(\pi)$ c) $g(x)g(\pi)$ d) $\frac{g(x)}{g(\pi)}$

9. $\int \cos^3 x\, e^{\log(\sin x)} dx$ is equal to

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

10. $\int_8^{15} \frac{dx}{(x-3)\sqrt{x+1}}$ is equal to

a) $\frac{1}{2}\log\frac{5}{3}$ b) $\frac{1}{3}\log\frac{5}{3}$ c) $\frac{1}{5}\log\frac{3}{5}$ d) $\frac{1}{2}\log\frac{3}{5}$

11. The value of $\int \frac{ax^2-b}{x\sqrt{c^2x^2-(ax^2+b)^2}} dx$, is

a) $\sin^{-1}\left(\frac{ax+\frac{b}{x}}{c}\right)+k$ b) $\sin^{-1}\left(\frac{ax^2+\frac{b}{x^2}}{c}\right)+k$ c) $\cos^{-1}\left(\frac{ax+b/x}{c}\right)+k$ d) $\cos^{-1}\left(\frac{ax^2+\frac{b}{x^2}}{c}\right)+k$

12. If $f(x) = \int_{-1}^{x} |t| dt$, then for any $x \geq 0$, $f(x)$ equals

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

13. Let $I_1 = \int_1^2 \frac{1}{\sqrt{1+x^2}} dx$ and $I_2 = \int_1^2 \frac{1}{x} dx$. Then

a) $I_1 > I_2$ b) $I_2 > I_1$ c) $I_1 = I_2$ d) $I_1 > 2I_2$

14. The value of $\int_{-\pi}^{\pi} (1-x^2) \sin x \cos^2 x\, dx$ is

a) 0 b) $\pi - \frac{\pi^3}{3}$ c) $2\pi - \pi^3$ d) $\frac{7}{2} - 2\pi^3$

15. If $I_n = \int_0^{\pi/2} x^n \sin x\, dx$, then $I_4 + 12I_2$ is equal to

a) 4π b) $3\left(\frac{\pi}{2}\right)^3$ c) $\left(\frac{\pi}{2}\right)^2$ d) $4\left(\frac{\pi}{2}\right)^3$

16. The value of the integral $\int_0^2 x[x]\, dx$, is

a) $\frac{7}{2}$ b) $\frac{3}{2}$ c) $\frac{5}{2}$ d) None of these

17. $\int_{-1}^{0} \frac{dx}{x^2+2x+2}$ is equal to

a) 0 b) $\pi/4$ c) $\pi/2$ d) $-\pi/4$

18. The value of $\int_{-\pi/4}^{\pi/4} x^3 \sin^4 x\, dx$ is

a) $\frac{\pi}{4}$ b) $\frac{\pi}{2}$ c) $\frac{\pi}{8}$ d) 0

19. Let f be a positive function. Let $I_1 = \int_{1-k}^{k} xf\{x(1-x)\}, I_2 = \int_{1-k}^{k} f\{x(1-x)\}\, dx$ where $2k-1 > 0$. Then, $\frac{I_1}{I_2}$ is

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

20. If $I_n = \int_0^{\pi/4} \tan^n x\, dx$, then $\lim_{n\to\infty} n(I_{n+1} + I_{n-1})$ equals

a) 1 b) 2 c) $\pi/4$ d) π

SESSION : 2025-26

DPP
DAILY PRACTICE PROBLEMS

CLASS : XIIth **SUBJECT : MATHS**
DATE : **DPP NO. :5**

Topic :-INTEGRALS

1. $\int_1^e \frac{1}{x}dx$ is equal to
   a) ∞ b) 0 c) 1 d) $\log(1+e)$

2. $\lim_{n\to\infty} \frac{1^{99}+2^{99}+\cdots+n^{99}}{n^{100}} =$
   a) $\frac{99}{100}$ b) $\frac{1}{100}$ c) $\frac{1}{99}$ d) $\frac{1}{101}$

3. $\int \frac{\cos 2x}{\cos x}dx$ is equal to
   a) $2\sin x + \log(\sec x - \tan x) + C$
   b) $2\sin x - \log(\sec x - \tan x) + C$
   c) $2\sin x + \log(\sec x + \tan x) + C$
   d) None of these

4. $\int f'(ax+b)\{f(ax+b)\}^n\ dx$ is equal to
   a) $\frac{1}{n+1}\{f(ax+b)\}^{n+1} + C$, for all n except $n=-1$
   b) $\frac{1}{n+1}\{f(ax+b)\}^{n+1} + C$, for all n
   c) $\frac{1}{a(n+1)}\{f(ax+b)\}^{n+1} + C$, for all n except $n=-1$
   d) $\frac{1}{a(n+1)}\{f(ax+b)\}^{n+1} + C$, for all n

5. If $I_1 = \int_0^1 2^{x^2}\ dx, I_2 = \int_0^1 2^{x^3}\ dx, I_3 = \int_1^2 2^{x^2}\ dx$ and $I_4 = \int_1^2 2^{x^3}\ dx$, then
   a) $I_3 > I_4$ b) $I_3 = I_4$ c) $I_1 > I_2$ d) $I_2 > I_1$

6. $\int \frac{\sqrt{\tan x}}{\sin x \cos x}\ dx = \ldots + c; x \neq \frac{k\pi}{2}$ and $\tan x > 0$
   a) $\frac{1}{2\sqrt{\tan x}}$ b) $\sqrt{2\tan x}$ c) $2\sqrt{\tan x}$ d) $\sqrt{\tan x}$

7. $\lim_{n\to\infty} \frac{1}{n}\sum_{r=1}^{2n} \frac{r}{\sqrt{n^2+r^2}}$ equals
   a) $1+\sqrt{5}$ b) $-1+\sqrt{5}$ c) $-1+\sqrt{2}$ d) $1+\sqrt{2}$

8. $\int_0^\infty \frac{x\log x\ dx}{(1+x^2)^2}$ is equal to
   a) 0 b) 1 c) ∞ d) None of these

9. The value of $\int_{-1}^{1}[x[1+\sin \pi x]\, dx$ is ([·] denotes the greatest integer)

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

10. If $\int_0^\infty e^{-x^2}\, dx = \sqrt{\frac{\pi}{2}}$ then $\int_0^\infty e^{-ax^2}\, dx, a > 0$ is

a) $\frac{\sqrt{\pi}}{2}$ b) $\frac{\sqrt{\pi}}{2a}$ c) $2\frac{\sqrt{\pi}}{a}$ d) $\frac{1}{2}\frac{\sqrt{\pi}}{a}$

11. If $\int \frac{2^x}{\sqrt{1-4^x}} dx = K \sin^{-1}(2^x) + C$, then K is equal to

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

12. The value of the integral $\int_{-\pi}^{\pi}(\cos ax - \sin bx)^2\, dx$, where ($a$ and b integers), is

a) $-\pi$ b) 0 c) π d) 2π

13. $\int \frac{mx^{m+2n-1}-nx^{n-1}}{x^{2m+2n}+2x^{m+n}+1}\, dx$ is equal to

a) $\frac{x^m}{x^{m+n}+1} + c$ b) $\frac{x^n}{x^{m+n}+1} + c$ c) $\frac{x^{m+n}-1}{x^{m+n}+1} + c$ d) $-\frac{x^n}{x^{m+n}+1} + c$

14. The value of $\int_0^{16\,\pi/3}|\sin x|dx$, is

a) 21 b) 21/2 c) 10 d) 11

15. If $f(x)$ and $g(x), x\epsilon R$ are continuous functions, then value of integral $\int_{-\pi/2}^{\pi/2}[\{f(x)+f(-x)\}\{g(x)-g(-x)\}]\, dx$is

a) π b) $\frac{\pi}{2}$ c) 1 d) 0

16. $\int \frac{\sqrt{\tan x}}{\sin x \cos x} dx$ is equal to

a) $2\sqrt{\tan x} + C$ b) $2\sqrt{\cot x} + C$ c) $\frac{\sqrt{\tan x}}{2} + C$ d) None of these

17. $\int_0^1 \sin\left\{2\tan^{-1}\sqrt{\frac{1+x}{1-x}}\right\} dx =$

a) $\pi/6$ b) $\pi/4$ c) $\pi/2$ d) π

18. If $\int_{-\pi/3}^{\pi/3}\left(\frac{a}{3}|\tan x| + \frac{b\tan x}{1+\sec x}\right) dx = 0$ where a, b, c are constants, then $c =$

a) $a \ln 2$ b) $\frac{a}{\pi}\ln 2$ c) $-\frac{a}{\pi}\ln 2$ d) $\frac{2a}{\pi}\ln 2$

19. If the tangent to the graph function $y = f(x)$ makes angles$\frac{\pi}{4}$ and $\frac{\pi}{3}$ with the x-axis is at the point $x = 2$ and $x = 4$ respectively, the value of $\int_2^4 f'(x)f''(x)\ dx$

a) $f(4)f(2)$ b) $f(4)$ c) $f(2)$ d) 1

s20. $\int \frac{dx}{\cos^3 \sqrt{2} \sin 2x}$ is equal to

a) $\sqrt{\tan x} + \frac{\tan^{5/2} x}{5} + c$

b) $\sqrt{\tan x} + \frac{2}{5}\tan^{5/2} x + c$

c) $2\sqrt{\tan x} + \frac{2}{5}\tan^{5/2} x + c$

d) None of these

SESSION : 2025-26

DPP
DAILY PRACTICE PROBLEMS

CLASS : XIIth **SUBJECT : MATHS**
DATE : **DPP NO. :6**

Topic :-INTEGRALS

1. Let $f(x) = \int \frac{x^2 dx}{(1+x^2)(1+\sqrt{1+x^2})}$ and $f(0) = 0$. Then, $f(1)$ is
   a) $\log(1+\sqrt{2})$ b) $\log(1+\sqrt{2}) - \frac{\pi}{4}$ c) $\log(1+\sqrt{2}) + \frac{\pi}{4}$ d) None of these

2. The value of the integral $\int_0^1 \frac{1}{(1+x^2)^{3/2}} dx$, is
   a) $1/2$ b) $1/\sqrt{2}$ c) 1 d) $\sqrt{2}$

3. If $I(m,n) = \int_0^1 t^m (1+t)^n \, dt$, then the expression for $I(m,n)$ in terms of $I(m+1, n-1)$ is
   a) $\frac{2^n}{m+1} - \frac{n}{m+1} I(m+1, n-1)$ b) $\frac{n}{m+1} I(m+1, n-1)$
   c) $\frac{2^n}{m+1} + \frac{n}{m+1} I(m+1, n-1)$ d) $\frac{m}{n+1} I(m+1, n-1)$

4. The value of $\int_0^1 \frac{\tan^{-1} x}{1+x^2} dx$ is
   a) $\frac{\pi}{4}$ b) $\frac{\pi^2}{32}$ c) 1 d) None of these

5. The value of $\int_3^5 \frac{x^2}{x^2-4} dx$ is
   a) $2 - \log_e\left(\frac{15}{7}\right)$ b) $2 + \log_e\left(\frac{15}{7}\right)$
   c) $2 + 4\log_e 3 - 4\log_e 7 + 4\log_e 5$ d) $2 - \tan^{-1}\left(\frac{15}{7}\right)$

6. $\int \sqrt{x^2+a^2} \, dx$ equals
   a) $\frac{x}{2}\sqrt{x^2+a^2} - \frac{a^2}{2}\log\{x + \sqrt{x^2+a^2}\} + c$ b) $\frac{x}{2}\sqrt{x^2+a^2} + \frac{a^2}{2}\log\{x + \sqrt{x^2+a^2}\} + c$
   c) $\frac{x}{2}\sqrt{x^2+a^2} - \frac{a^2}{2}\log\{x - \sqrt{x^2+a^2}\} + c$ d) $\frac{x}{2}\sqrt{x^2+a^2} + \frac{a^2}{2}\log\{x - \sqrt{x^2+a^2}\} + c$

7. $I_n = \int_0^{\pi/4} \tan^n x \, dx$, then $\lim_{n\to\infty} n[I_n + I_{n+2}]$ is equal to
   a) $\frac{1}{2}$ b) 1 c) ∞ d) zero

8. $\int (x^2+1)\sqrt{x+1} \, dx$ is equal to
   a) $\frac{(x+1)^{7/2}}{7} - 2\frac{(x+1)^{5/2}}{5} + 2\frac{(x+1)^{3/2}}{3} + c$ b) $2\left[\frac{(x+1)^{7/2}}{7} - 2\frac{(x+1)^{5/2}}{5} + 2\frac{(x+1)^{3/2}}{3}\right] + c$
   c) $\frac{(x+1)^{7/2}}{7} - 2\frac{(x+1)^{5/2}}{5} + 5$ d) $\frac{(x+1)^{7/2}}{7} - 3\frac{(x+1)^{5/2}}{5} + 11(x+1)^{1/2} + c$

9. $\int \frac{f'(x)}{f(x)\log[f(x)]}dx$ is equal to

a) $\frac{f(x)}{\log f(x)}+c$ b) $f(x)\log f(x)+c$ c) $\log[\log f(x)]+c$ d) $\frac{1}{\log[\log f(x)]}+c$

10. Consider the integrals

$I_1=\int_0^1 e^{-x}\cos^2 x\ dx, I_2=\int_0^1 e^{-x^2}\cos^2 x\ dx, I_3=\int_0^1 e^{-x^2}\ dx$ and $I_4=\int_0^1 e^{-(1/2)x^2}\ dx$. The greatest of these integral is

a) I_1 b) I_2 c) I_3 d) I_4

11. $\int \frac{1}{(1+x^2)\sqrt{1-x^2}}dx$ is equal to

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

12. The value of the integral $\int_{1/n}^{(an-1)/n}\frac{\sqrt{x}}{\sqrt{a-x}+\sqrt{x}}\ dx$ is

a) $\frac{a}{2}$ b) $\frac{na+2}{2n}$ c) $\frac{na-2}{2n}$ d) None of these

13. The value of $\int e^x(x^5+5x^4+1)dx$ is

a) $e^x.x^5+c$ b) $e^x.x^5+e^x+c$ c) $e^{x+1}.x^5+c$ d) $5x^4.e^x+c$

14. If $\int_{-1/2}^{1/2}\cos x\log\left(\frac{1+x}{1-x}\right)dx=k.\log 2$, then k equals

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

15. $\int \sin\sqrt{3}\ dx$ is equal to

a) $\sin\sqrt{x}-\sqrt{x}\cos\sqrt{x}$ b) $2\left(\sin\sqrt{x}-\sqrt{x}\cos\sqrt{x}\right)+c$

c) $\cos\sqrt{x}-\sqrt{x}\sin\sqrt{x}+c$ d) $2\left(\cos\sqrt{x}-\sqrt{x}\sin\sqrt{x}\right)+c$

16. If $f(x)=\int_x^{x^2}(t-1)dt, 1\le x\le 2$, then global maximum value of $f(x)$ is

a) 1 b) 2 c) 3 d) 4

17. $\lim_{n\to\infty}\frac{1}{n}\sum_{r=1}^{n}\frac{r}{\sqrt{n^2+r^2}}$ is equal to

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

18. The value of $\int_0^{2\pi}\cos^{99}x\,dx$, is

a) 1 b) -1 c) 99 d) 0

19. The value of $\int_{-2}^{2}(ax^3+bx+c)dx$ depends on the

a) Value of b b) Value of c c) Value of a d) Values of a and b

20. The value of integral $\int_0^{\pi}x\,f(\sin x)\ dx$ is

a) 0 b) $\pi\int_0^{\pi/2}f\ (\sin x)\ dx$ c) $\frac{\pi}{4}\int_0^{\pi}f\ (\sin x)\ dx$ d) None of these

SESSION : 2025-26

DPP
DAILY PRACTICE PROBLEMS

CLASS : XIIth **SUBJECT : MATHS**
DATE : **DPP NO. :7**

Topic :-INTEGRALS

1. The value of the integral $\int \frac{\log(x+1)-\log x}{x(x+1)}dx$ is
   a) $-\frac{1}{2}[\log(x+1)]^2 - \frac{1}{2}(\log x)^2 + \log(x+1)\log x + c$
   b) $-[\{\log(x+1)\}^2 - (\log x)^2] + \log(x+1)\log x + c$
   c) $\left[\log\left(1+\frac{1}{x}\right)^2\right] + c$
   d) None of the above

2. The value of $I = \int_0^1 x\left|x - \frac{1}{2}\right| dx$ is
   a) $\frac{1}{3}$ b) $\frac{1}{4}$ c) $\frac{1}{8}$ d) None of these

3. $\int \frac{a^{x/2}}{\sqrt{a^{-x}-a^x}}dx =$
   a) $\frac{1}{\log a}\sin^{-1}(a^x)$ b) $\frac{1}{\log a}\tan^{-1}(a^x)$ c) $2\sqrt{a^{-x}-a^x}$ d) $\log(a^x-1)$

4. If $\int_{\log 2}^{x} \frac{du}{(e^u-1)^{1/2}} = \frac{\pi}{6}$, then e^x is equal to
   a) 1 b) 2 c) 4 d) -1

5. $\int\{f(x)g''(x) - f''(x)g(x)\}dx$ is equal to
   a) $\frac{f(x)}{g'(x)}$
   b) $f'(x)g(x) - f(x)g'(x)$
   c) $f(x)g'(x) - f'(x)g(x)$
   d) $f(x)g'(x) + f'(x)g(x)$

6. The value of $\int_{-\pi/4}^{\pi/4} x^3 \sin^4 x\, dx$, is equal to
   a) $\frac{\pi}{4}$ b) $\frac{\pi}{2}$ c) $\frac{\pi}{8}$ d) 0

7. The value of $\int_0^{\pi/2} \sin^8 x\ dx$ is
   a) $\frac{105\pi}{32(4!)}$ b) $\frac{105\pi}{14(4!)}$ c) $\frac{105}{16\pi(4!)}$ d) None of these

8. $\int_{-\pi/2}^{\pi/2} \frac{|x|}{8\cos^2 2x+1}\,dx$ has the value

a) $\frac{\pi^2}{6}$ b) $\frac{\pi^2}{12}$ c) $\frac{\pi^2}{24}$ d) None of these

9. If $\int f(x)\cos x\,dx = \frac{1}{2}\{f(x)\}^2 + c$, then $f(x)$ is

a) $x + c$ b) $\sin x + c$ c) $\cos x + c$ d) c

10. If $f(x) = \frac{x+2}{2x+3}$. Then, $\int \left(\frac{f(x)}{x^2}\right)^{1/2} dx$ is equal to $\frac{1}{\sqrt{2}} g\left(\frac{1+\sqrt{2f(x)}}{1-\sqrt{2f(x)}}\right) - \sqrt{\frac{2}{3}} h\left(\frac{\sqrt{3f(x)}+\sqrt{2}}{\sqrt{3f(x)}-\sqrt{2}}\right) + c$ where

a) $g(x) = \tan^{-1} x, h(x) = \log|x|$ b) $g(x) = \log|x|, h(x) = \tan^{-1} x$

c) $g(x) = h(x) = \tan^{-1} x$ d) $g(x) = \log|x|, h(x) = \log|x|$

11. $\int 5^{5^{5^x}} \cdot 5^{5^x} \cdot 5^x\,dx$ is equal to

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

12. If $f(t) = \int_{-t}^{t} \frac{e^{-|x|}}{2}\,dx$, then $\lim_{t\to\infty} f(t)$ is equal to

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

13. $\int \frac{\cos 2x}{(\sin x+\cos x)^2}\,dx$ is equal to

a) $\frac{-1}{\sin x+\cos x} + C$

b) $\log(\sin x + \cos x) + C$

c) $\log(\sin x - \cos x) + C$

d) $\log(\sin x + \cos x)^2 + C$

14. If the primitive of $\sin^{-3/2} x \sin^{-1/2}(x+\theta)$ is $-2\,\text{cosec}\theta\sqrt{f(x)} + c$, then

a) $f(x) = \frac{\sin x}{\sin(x+\theta)}$ b) $f(x) = \tan(x+\theta)$ c) $f(x) = \frac{\sin(x+\theta)}{\sin x}$ d) $f(x) = \frac{\tan(x+\theta)}{\sin x}$

15. $\int \frac{x^4-1}{x^2\sqrt{x^4+x^2+1}}\,dx$ is equal to

a) $\frac{x}{\sqrt{x^4+x^2+1}} + C$ b) $\frac{\sqrt{x^4+x^2+1}}{x} + C$ c) $\frac{2x}{\sqrt{x^4+x^2+1}} + C$ d) $\frac{\sqrt{x^4+x^2+1}}{2x} + C$

16. $\int 32x^3(\log x)^2\,dx$ is equal to

a) $8x^4(\log x)^2 + c$ b) $x^4\{8(\log x)^2 - 4\log x + 1\} + c$

c) $x^4\{8(\log x)^2 - 4\log x\} + c$ d) $x^3\{(\log x)^2 + 2\log x\} + c$

17. $\int \frac{e^x(1+\sin x)}{1+\cos x}\,dx$ is equal to

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

18. If $\int \log\left(\sqrt{1-x} + \sqrt{1+x}\right) dx = x\,f(x) + Ax + B\sin^{-1} x + C$, then

a) $f(x) = \log\left(\sqrt{1-x} + \sqrt{1+x}\right)$

b) $A = 1/3$
c) $B = 2/3$
d) $B = -1/2$

19. $\int_0^{\pi/4} \log(1 + \tan x)\, dx$ is equal to

a) $\frac{\pi}{8}\log_e 2$ b) $\frac{\pi}{4}\log_2 e$ c) $\frac{\pi}{4}\log_e 2$ d) $\frac{\pi}{8}\log_e\left(\frac{1}{2}\right)$

20. $\int_{-1}^{2} \sin^3 x\, |x|\, dx$ is equal to

a) 0 b) 1 c) 4 d) None of these

SESSION : 2025-26

DPP
DAILY PRACTICE PROBLEMS

CLASS : XIIth **SUBJECT : MATHS**
DATE : **DPP NO. :8**

Topic :-INTEGRALS

1. $\int_0^{1000} e^{x-[x]}dx$ is
   a) $e^{1000}-1$ b) $\frac{e^{1000}-1}{e-1}$ c) $1000(e-1)$ d) $\frac{e-1}{1000}$

2. $\int \frac{(\tan^{-1}x)^3}{(1+x^2)}dx$ is equal to
   a) $3(\tan^{-1}x)^2+c$ b) $\frac{(\tan^{-1}x)^4}{4}+c$ c) $(\tan^{-1}x)^4+c$ d) None of these

3. The value of $\int_0^{\pi} |\sin^3\theta| d\theta$ is
   a) 0 b) π c) $\frac{4}{3}$ d) $\frac{3}{8}$

4. If $d[f(x)] = e^{\tan x}\sec^2 x\,dx$, then $f(x)$ is equal to
   a) $e^{\tan x}+c$ b) $e^{\sec^2 x}+c$ c) $e^{\sin x}+c$ d) None of these

5. The value of $\int_1^2 \{f(g(x))\}^{-1} f'(g(x))g'(x)dx$, where $g(1)=g(2)$, is equal to
   a) 1 b) 2 c) 0 d) None of these

6. Let f be a function such that $f(1)=4$ and $f'(x)\geq 2$for $1\leq x<4$. How small can $f(4)$ possibly be?
   a) 8 b) 12 c) 16 d) 10

7. $\int \frac{f'(x)}{f(x)\log[f(x)]}dx$ is equal to
   a) $\frac{f(x)}{\log f(x)}+c$ b) $f(x).\log f(x)+c$ c) $\log[\log f(x)]+c$ d) $\frac{1}{\log[\log f(x)]}+c$

8. $\int_0^{\pi/2} \frac{2\sqrt{\cos\theta}}{3(\sqrt{\sin\theta}+\sqrt{\cos\theta})}d\theta$ is equal to
   a) $\frac{\pi}{6}$ b) $\frac{\pi}{4}$ c) $\frac{\pi}{2}$ d) None of these

9. The value of $\lim_{n\to\infty}\left[\frac{n}{n^2+1^2}+\frac{n}{n^2+2^2}+\ldots+\frac{n}{n^2+n^2}\right]$
   a) $\frac{\pi}{4}$ b) $\log 2$ c) 0 d) 1

10. The value of $\int_{-\pi}^{\pi} \sin x \ f(\cos x)dx$ is

a) π b) 2π c) $2f(1)$ d) None of these

11. If $\int \frac{\sin x}{\cos x(1+\cos x)} dx = f(x) + c$, then $f(x)$ is equal to

a) $\log\left|\frac{1+\cos x}{\cos x}\right|$ b) $\log\left|\frac{\cos x}{1+\cos x}\right|$ c) $\log\left|\frac{\sin x}{1+\sin x}\right|$ d) $\log\left|\frac{1+\sin x}{\sin x}\right|$

12. If $f(x)$ satisfies the requirements of Rolle's Theorem in [1, 2] and $f'(x)$ is continuous in [1, 2], then $\int_1^2 f'(x)\, dx$ is equal to

a) 0 b) 1 c) 3 d) -1

13. The value of $\int e^{2x}(2\sin 3x + 3\cos 3x)dx$ is

a) $e^{2x}\sin 3x + c$ b) $e^{2x}\cos 3x + c$ c) $e^{2x} + c$ d) $e^{2x}\ (2\sin 3x) + c$

14. $\int_{-2}^{2} |[x]|\, dx$ is equal to

a) 1 b) 2 c) 3 d) 4

15. If $\int_0^{\pi/2} \cos^n x \sin^n x \ dx = \lambda \int_0^{\pi/2} \sin^n x \ dx$, then $\lambda =$

a) $\frac{1}{2^{n-1}}$ b) $\frac{1}{2^{n+1}}$ c) $\frac{1}{2^n}$ d) $\frac{1}{2}$

16. If x satisfies the equation

$$x^2\left(\int_0^1 \frac{dt}{t^2 + 2t\cos\alpha + 1}\right) - x\left(\int_{-3}^{3} \frac{t^2 \sin 2t}{t^2 + 1} dt\right) - 2 = 0$$

$(0 < \alpha < \pi)$, then the value of x is

a) $\pm 2\sqrt{\frac{\sin\alpha}{\alpha}}$ b) $\pm\sqrt{\frac{\sin\alpha}{\alpha}}$ c) $\pm 4\sqrt{\frac{\sin\alpha}{\alpha}}$ d) None of these

17. $\int_{\pi/6}^{\pi/3} \frac{dx}{1+\sqrt{\tan x}}$ is equal to

a) $\frac{\pi}{12}$ b) $\frac{\pi}{2}$ c) $\frac{\pi}{6}$ d) $\frac{\pi}{4}$

18. $\int_0^2 [x^2]dx$is

a) $2 - \sqrt{2}$ b) $2 + \sqrt{2}$ c) $\sqrt{2} - 1$ d) $-\sqrt{2} - \sqrt{3} + 5$

19. If $f(x)\sin x \cos x\, dx = \frac{1}{2(b^2-a^2)}\log f(x) + c$, the $f(x)$ is equal to

a) $\frac{1}{a^2\sin^2 x + b^2\cos^2 x}$ b) $\frac{1}{a^2\sin^2 x - b^2\cos^2 x}$ c) $\frac{1}{a^2\cos^2 x + b^2\sin^2 x}$ d) $\frac{1}{a^2\cos^2 x - b^2\sin^2 x}$

20. If $f(x) = f(a - x)$, then $\int_0^a f(x)dx$ is equal to

a) $\int_0^a f(x)dx$ b) $\frac{a^2}{2}\int_0^a f(x)dx$ c) $\frac{a}{2}\int_0^a f(x)dx$ d) $-\frac{a}{2}\int_0^a f(x)dx$

DPP
DAILY PRACTICE PROBLEMS

CLASS : XIIth **SUBJECT : MATHS**
DATE : **DPP NO. : 9**

Topic :-INTEGRALS

1. The value of the integral $\int_{1/e}^{e} |\log x| \, dx$, is
   a) $2\left(\frac{e-1}{e}\right)$ b) $2\left(\frac{1-e}{e}\right)$ c) $2-\frac{1}{e}$ d) None of these

2. $\int_0^{\pi/8} \cos^3 4\theta d\theta$ is equal to
   a) $\frac{5}{3}$ b) $\frac{5}{4}$ c) $\frac{1}{3}$ d) $\frac{1}{6}$

3. $\int_{-1}^{1} \frac{\cos h\, x}{1+e^{2x}}\, dx$ is equal to
   a) 0 b) 1 c) $\frac{e^2-1}{2e}$ d) $\frac{e^2+2}{2e}$

4. If $u_{10} = \int_0^{\pi/2} x^{10} \sin x \; dx$, then the value of $u_{10} + 90\, u_8$, is
   a) $9\left(\frac{\pi}{2}\right)^8$ b) $\left(\frac{\pi}{2}\right)^9$ c) $10\left(\frac{\pi}{2}\right)^9$ d) $9\left(\frac{\pi}{2}\right)^9$

5. $\int \frac{x^3 \sin[\tan^{-1}(x^4)]}{1+x^8} dx$ is equal to
   a) $\frac{1}{4}\cos[\tan^{-1}(x^4)] + c$ b) $\frac{1}{4}\sin[\tan^{-1}(x^4)] + c$
   c) $-\frac{1}{4}\cos[\tan^{-1}(x^4)] + c$ d) $\frac{1}{4}\sec^{-1}[\tan^{-1}(x^4)] + c$

6. $\left[\sum_{n=1}^{10} \int_{-2n-1}^{-2n} \sin^{27} x\, dx\right] + \left[\sum_{n=1}^{10} \int_{2n}^{2n+1} \sin^{27} x\, dx\right]$ equals
   a) 27^2 b) -54 c) 54 d) 0

7. $\int \frac{1}{\sin^2 x.\cos^2 x}\, dx$ is equal to
   a) $\sin x - \cos x + c$ b) $\tan x + \cot x + c$ c) $\cos x + \sin x + c$ d) $\tan x - \cot x + c$

8. The value of the integral $\int_{-1}^{1} (x - [2x])\, dx$, is
   a) 1 b) 0 c) 2 d) 4

9. The function $F(x) = \int_0^x \log\left(\frac{1-x}{1+x}\right) dx$, is
   a) An even function b) An odd function c) A periodic function d) None of these

10. If $\int \frac{1}{x\sqrt{1-x^3}}\,dx = a\log\left|\frac{\sqrt{1-x^2}-1}{\sqrt{1-x^2}+1}\right| + b$, then a is equal to

a) $\frac{1}{3}$ b) $\frac{2}{3}$ c) $-\frac{1}{3}$ d) $-\frac{2}{3}$

11. $\frac{d}{dx}\left(\int_{f(x)}^{g(x)} \phi(t)dt\right)$ is equal to

a) $\phi\big(g(x)\big) - \phi\big(f(x)\big)$

b) $\frac{1}{2}\big[\phi\big(g(x)\big)\big]^2 - \frac{1}{2}\big[\phi\big(f(x)\big)\big]^2$

c) $g'(x)\phi\big(g(x)\big) - f'(x)\phi\big(f(x)\big)$

d) $\phi'\big(g(x)\big)g'(x) - \phi'\big(f(x)\big)f'(x)$

12. $\int_1^3 (x-1)(x-2)(x-3)dx$ is equal to

a) 3 b) 2 c) 1 d) 0

13. If $f(x) = \begin{vmatrix} \sin x + \sin 2x + \sin 3x & \sin 2x & \sin 3x \\ 3 + 4\sin x & 3 & 4\sin x \\ 1 + \sin x & \sin x & 1 \end{vmatrix}$, then the value of $\int_0^{\pi/2} f(x)dx$ is

a) 3 b) $\frac{2}{3}$ c) $\frac{1}{3}$ d) 0

14. If $\int g(x)dx = g(x)$, then $\int g(x)\{f(x) + f'(x)\}\,dx$ is equal to

a) $g(x)f(x) - g(x)f'(x) + C$

b) $g(x)f'(x) + C$

c) $g(x)f(x) + C$

d) $g(x)f^2(x) + C$

15. $\int \left(\frac{x+2}{x+4}\right)^2 e^x\,dx$ 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) $\left(\frac{2xe^x}{x+4}\right) + c$

16. If $P = \int_0^{3\pi} f(\cos^2 x)\,dx$ and $Q = \int_0^{\pi} f(\cos^2 x)\,dx$, then

a) $P - Q = 0$ b) $P - 2\,Q = 0$ c) $P - 3\,Q = 0$ d) $P - 5\,Q = 0$

17. If $I_1 = \int_0^{3\pi} f(\cos^2 x)dx$ and $I_2 = \int_0^{\pi} f(\cos^2 x)dx$ then

a) $I_1 = I_2$ b) $I_1 = 2I_2$ c) $I_1 = 5I_2$ d) None of these

18. For any $n \in N$ and $x \in R^+$, the value of the integral $\int_0^{n[x]}(x - [x])dx$, is

a) $n[x]$ b) $[x]$ c) $\frac{n}{2}[x]$ d) None of these

19. $\int_0^1 \frac{x^3\,dx}{(x^2+1)^{3/2}}$ is equal to

a) $\left(\sqrt{2}-1\right)^2$ b) $\frac{\left(\sqrt{2}-1\right)^2}{2}$ c) $\frac{\sqrt{2}-1}{2}$ d) None of these

20. The value of $\int_0^{2\pi} |\cos x - \sin x|\, dx$, is

a) $\frac{4}{\sqrt{2}}$ b) $2\sqrt{2}$ c) $\frac{2}{\sqrt{2}}$ d) $4\sqrt{2}$

SESSION : 2025-26

DPP
DAILY PRACTICE PROBLEMS

CLASS : XIIth **SUBJECT : MATHS**
DATE : **DPP NO. :10**

Topic :-INTEGRALS

1. The value of $\int_{-\pi/2}^{\pi/2}(x^3 + x\cos x + \tan^5 x + 1)dx$is equal to
   a) 0 b) 2 c) π d) None of these

2. If a function $f(x)$ satisfies $f'(x) = g(x)$Then, the value of $\int_a^b f(x)g(x)dx$is
   a) $\frac{1}{2}\left[\left(f(b)\right)^2 - \left(F(a)\right)^2\right]$ b) $\frac{1}{2}\left[\left(f(b)\right)^2 + \left(f(a)\right)^2\right]$ c) $\frac{1}{2}[f(b) - f(a)]^2$
   d) None of these

3. If $\int \frac{4e^x+6e^{-x}}{9e^x-4e^{-x}}dx = Ax + B\log(9e^{2x} - 4) + C$, then
   a) $A = -\frac{3}{2}, B = \frac{35}{36}, C = 0$
   b) $A = \frac{35}{36}, B = -\frac{3}{2}, C \in R$
   c) $A = -\frac{3}{2}, B = \frac{35}{36}, C \in R$
   d) None of these

4. If $\int \frac{\cos 4x+1}{\cot x-\tan x}dx = k\cos 4x + c$, then
   a) $k = -1/2$ b) $k = -1/8$ c) $k = -1/4$ d) None of these

5. The value of $\int_{-2}^{4}|x + 1|dx$ is equal to
   a) 12 b) 14 c) 13 d) 16

6. $\int_2^3 \frac{dx}{x^2-x}$ is equal to
   a) $\log\left(\frac{2}{3}\right)$ b) $\log\left(\frac{1}{4}\right)$ c) $\log\left(\frac{4}{3}\right)$ d) $\log\left(\frac{8}{3}\right)$

7. The value of $\int \frac{x^2+1}{x^4-x^2+1}dx$ is
   a) $\tan^{-1}(2x^2 - 1) + c$ b) $\tan^{-1}\frac{x^2+1}{x} + c$ c) $\sin^{-1}\left(x - \frac{1}{x}\right) + c$ d) $\tan^{-1}\left(\frac{x^2-1}{x}\right) + c$

8. $\int \frac{1+\tan x}{e^{-x}\cos x}\,dx$ is equal to

a) $e^{-x}\tan x + c$ b) $e^{-x}\sec x + c$ c) $e^{x}\sec x + c$ d) $e^{x}\tan x + c$

9. If $f(x) = \int_{x^2}^{x^2+1} e^{-t^2}\,dt$, then $f(x)$ increases in

a) $(2, 2)$ b) No value of x c) $(0, \infty)$ d) $(-\infty, 0)$

10. $\int \frac{x^2-1}{(x^2+1)\sqrt{x^4+1}}\,dx$ is equal to

a) $\sec^{-1}\left(\frac{x^2+1}{x\sqrt{2}}\right) + c$ b) $\frac{1}{2}\sec^{-1}\left(\frac{x^2+1}{\sqrt{2}}\right) + c$ c) $\frac{1}{2}\sec^{-1}\left(\frac{x^2+1}{x\sqrt{2}}\right) + c$ d) None of these

11. If $\left(\int_0^a x\,dx\right) \leq (a+4)$, then

a) $0 \leq a \leq 4$ b) $-2 \leq a \leq 4$ c) $-2 \leq a \leq 0$ d) $a \leq -2$ or $a \geq 4$

12. If $u_n = \int_0^{\pi/4} \tan^n x\,dx$, then $u_n + u_{n-2}$ is equal to

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

13. $\int_0^{\pi} x\sin^4 x\,dx$ is equal to

a) $\frac{3\pi}{16}$ b) $\frac{3\pi^2}{16}$ c) $\frac{16\pi}{3}$ d) $\frac{16\pi^2}{3}$

14. $\int \frac{\sin x-\cos x}{\sqrt{1-\sin 2x}} e^{\sin x}\cos x\,dx$ is equal to

a) $e^{\sin x} + C$ b) $e^{\sin x-\cos x} + C$ c) $e^{\sin x+\cos x} + C$ d) $e^{\cos x-\sin x} + C$

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

a) $3\sqrt{x} + 3\left(\sqrt[3]{x}\right) - 6\sqrt[6]{x} + 6\log\left(\sqrt[6]{x+1}\right) + c$ b) $2\sqrt{x} + 6\left(\sqrt[6]{x}\right) - 6\log\left(\sqrt[6]{x+1}\right) + c$

c) $2\sqrt{x} - 3\left(\sqrt[3]{x}\right) + 6\left(\sqrt[6]{x}\right) - 6\log\left(\sqrt[6]{x+1}\right) + c$ d) None of the above

16. $\int \sqrt[3]{x}\sqrt[7]{1+\sqrt[3]{x^4}}dx$ is equal to

a) $\frac{21}{32}\left\{1+\sqrt[3]{x^4}\right\}^{8/7} + C$ b) $\frac{32}{21}\left\{1+\sqrt[3]{x^4}\right\}^{8/7} + C$ c) $\frac{7}{32}\left\{1+\sqrt[3]{x^4}\right\}^{8/7} + C$ d) None of these

17. If $\int \sin^{-1}\left(\frac{2x}{1+x^2}\right)dx = f(x) - \log(1+x^2) + c$, then $f(x)$ is equal to

a) $2x\tan^{-1} x$ b) $-2x\tan^{-1} x$ c) $x\tan^{-1} x$ d) $-x\tan^{-1} x$

18. If $I_{10} = \int_0^{\pi/2} x^{10}\sin x\,dx$. Then, the value of $I_{10} + 90I_8$ is

a) $10\left(\frac{\pi}{2}\right)^3$ b) $10\left(\frac{\pi}{2}\right)^9$ c) $\frac{\pi}{2}$ d) 0

19. $\int_0^{\pi} \frac{x\,dx}{a^2\cos^2 x + b^2\sin^2 x}$ is equal to

a) $\frac{\pi}{ab}$ b) $\frac{\pi}{2ab}$ c) $\frac{\pi^2}{ab}$ d) $\frac{\pi^2}{2ab}$

20. Let $f(x) = x - [x]$, for every real x, where $[x]$is the greatest integer less than or equal to x. Then, $\int_{-1}^{1} f(x)dx$ is

a) 1 b) 2 c) 3 d) 0