Date Planned : __ / __ / __	Daily Tutorial Sheet - 2	Expected Duration : 90 Min
Actual Date of Attempt : __ / __ / __	JEE Main (Archive)	Exact Duration :________

15. If $\int \frac{\sqrt{1-x^2}}{x^4}dx = A(x)\left(\sqrt{1-x^2}\right)^m + C$, for a suitable chosen integer m and a function $A(x)$, where C is a constant of integration, then $\left(A(x)\right)^m$ equals**:**

(A) $\frac{1}{9x^4}$ **(B)** $\frac{-1}{27x^9}$ **(C)** $\frac{-1}{3x^3}$ **(D)** $\frac{1}{27x^6}$

16. If $\int \frac{x+1}{\sqrt{2x-1}}dx = f(x)\sqrt{2x-1}+C$, where C is a constant of integration, then $f(x)$ is equal to: **(2019)**

(A) $\frac{2}{3}(x-4)$ **(B)** $\frac{2}{3}(x+2)$ **(C)** $\frac{1}{3}(x+1)$ **(D)** $\frac{1}{3}(x+4)$

17. The integral $\int \cos(\log_e x)dx$ is equal to: (where C is a constant of integration) **(2019)**

(A) $x[\cos(\log_e x)+\sin(\log_e x)]+C$ **(B)** $\frac{x}{2}[\cos(\log_e x)+\sin(\log_e x)]+C$

(C) $x[\cos(\log_e x)-\sin(\log_e x)]+C$ **(D)** $\frac{x}{2}[\sin(\log_e x)-\cos(\log_e x)]+C$

18. The integral $\int \frac{3x^{13}+2x^{11}}{\left(2x^4+3x^2+1\right)^4}dx$ is equal to: (where C is a constant of integration) **(2019)**

(A) $\frac{x^{12}}{6\left(2x^4+3x^2+1\right)^3}+C$ **(B)** $\frac{x^4}{\left(2x^4+3x^2+1\right)^3}+C$

(C) $\frac{x^4}{6\left(2x^4+3x^2+1\right)^3}+C$ **(D)** $\frac{x^{12}}{\left(2x^4+3x^2+1\right)^3}+C$

19. $\int \frac{\sin\frac{5x}{2}}{\sin\frac{x}{2}}dx$ is equal to : (where c is a constant of integration.) **(2019)**

(A) $2x+\sin x+\sin 2x+c$ **(B)** $x+2\sin x+\sin 2x+c$

(C) $2x+\sin x+2\sin 2x+c$ **(D)** $x+2\sin x+2\sin 2x+c$

20. If $\int \frac{dx}{x^3\left(1+x^6\right)^{2/3}} = xf(x)\left(1+x^6\right)^{\frac{1}{3}}+C$ where C is a constant of integration, then the function $f(x)$ is equal to: **(2019)**

(A) $\frac{3}{x^2}$ **(B)** $-\frac{1}{2x^3}$ **(C)** $-\frac{1}{2x^2}$ **(D)** $-\frac{1}{6x^3}$

21. The integral $\int \sec^{2/3} x \operatorname{cosec}^{4/3} x\, dx$ is equal to : (Here C is a constant of integration) **(2019)**

(A) $3\tan^{-1/3} x + C$ **(B)** $-3\cot^{-1/3} x + C$ **(C)** $-\frac{3}{4}\tan^{-4/3} x + C$ **(D)** $-3\tan^{-1/3} x + C$

22. If $\int e^{\sec x}(\sec x \tan x f(x) + (\sec x \tan x + \sec^2 x))dx = e^{\sec x} f(x) + C$, then a possible choice of $f(x)$ is: **(2019)**

(A) $\sec x + x\tan x - \frac{1}{2}$ **(B)** $x\sec x + \tan x + \frac{1}{2}$

(C) $\sec x - \tan x - \frac{1}{2}$ **(D)** $\sec x + \tan x + \frac{1}{2}$

23. If $\int \frac{dx}{\left(x^2 - 2x + 10\right)^2} = A\left(\tan^{-1}\left(\frac{x-1}{3}\right) + \frac{f(x)}{x^2 - 2x + 10}\right) + C$, where C is a constant of integration, then: **(2019)**

(A) $A = \frac{1}{54}$ and $f(x) = 9(x-1)^2$ **(B)** $A = \frac{1}{27}$ and $f(x) = 9(x-1)$

(C) $A = \frac{1}{81}$ and $f(x) = 3(x-1)$ **(D)** $A = \frac{1}{54}$ and $f(x) = 3(x-1)$

24. If $\int x^5 e^{-x^2} dx = g(x)e^{-x^2} + c$, where c is a constant of integration, then $g(-1)$ is equal to:

(A) 1 **(B)** -1 **(C)** $-\frac{5}{2}$ **(D)** $-\frac{1}{2}$ **(2019)**

25. The integral $\int \frac{2x^3 - 1}{x^4 + x} dx$ is equal to: (Here C is a constant of integration) **(2019)**

(A) $\frac{1}{2}\log_e \frac{\left(x^3+1\right)^2}{\left|x^3\right|} + C$ **(B)** $\log_e \frac{\left|x^3+1\right|}{x^2} + C$

(C) $\frac{1}{2}\log_e \frac{\left|x^3+1\right|}{x^2} + C$ **(D)** $\log_e \left|\frac{x^3+1}{x}\right| + C$

26. Let $\alpha \in \left(0, \frac{\pi}{2}\right)$ be fixed. If the integral $\int \frac{\tan x + \tan\alpha}{\tan x - \tan\alpha} dx = A(x)\cos 2\alpha + B(x)\sin 2\alpha + C$, where C is a constant of integration, then the functions $A(x)$ and $B(x)$ are respectively: **(2019)**

(A) $x - \alpha$ and $\log_e |\sin(x-\alpha)|$ **(B)** $x + \alpha$ and $\log_e |\sin(x+\alpha)|$

(C) $x - \alpha$ and $\log_e |\sin(x-\alpha)|$ **(D)** $x + \alpha$ and $\log_e |\sin(x-\alpha)|$