| Date Planned : __ / __ / __ | Daily Tutorial Sheet - 2 | Expected Duration : 90 Min |
|---|---|---|
| Actual Date of Attempt : __ / __ / __ | Level - 1 | Exact Duration :_____ |

**16.** For the function $f(x) = 1 + 3^x \log 3$, the antiderivative F assumes the value 7 for $x = 2$, At what value of $x$ does the curve $y = F(x)$ cut the abscissa?

**(A)** $x = 3$ **(B)** $x = 1$ **(C)** $x = 0$ **(D)** None of these

**17.** If $f(x) = \int \frac{(x^2 + \sin^2 x)}{1 + x^2} \sec^2 x \, dx$ and $f(0) = 0$, then $f(1)$ is:

**(A)** $1 - \frac{\pi}{4}$ **(B)** $\frac{\pi}{4} - 1$ **(C)** $\tan 1 - \frac{\pi}{4}$ **(D)** None of these

**18.** If $\int \frac{\sin^8 x - \cos^8 x}{1 - 2\sin^2 x \cos^2 x} dx = A \sin 2x + B$, then:

**(A)** $A = -\frac{1}{2}$ **(B)** $A = \frac{1}{2}$ **(C)** A = – 1 **(D)** A = 1

**19.** Integral of $\frac{1}{1 + (\log x)^2}$ w.r.t. $\log x$ is:

**(A)** $\frac{\tan^{-1}(\log x)}{x} + C$ **(B)** $\tan^{-1}(\log x) + C$ **(C)** $\frac{\tan^{-1} x}{x} + C$ **(D)** None of these

**20.** The equation of a curve passing through origin is given by $y = \int x^3 \cos x^4 \, dx$ **.** If the equation of the curve is written in the form $x = g(y)$, then:

**(A)** $g(y) = \sqrt[3]{\sin^{-1}(4y)}$ **(B)** $g(y) = \sqrt{\sin^{-1}(4y)}$

**(C)** $g(y) = \sqrt[4]{\sin^{-1}(4y)}$ **(D)** None of these

**21.** If $f''(x) = \sec^2 x$ and $f(0) = f'(0) = 0$ then:

**(A)** $f(x) = \log \sec x$ **(B)** $f(x) = \sec^2 x$

**(C)** $f(x) = \log \sec x + x$ **(D)** None of these

**22.** Let $f(x)$ be a polynomial of degree three satisfying $f(0) = -1$ and $f(1) = 0$. Also, 0 is a stationary point of $f(x)$. If $f(x)$ does not have an extremum at $x = 0$, then $\int \frac{f(x)}{x^3 - 1} dx$ is equal to:

**(A)** $\frac{x^2}{2} + C$ **(B)** $x + C$ **(C)** $\frac{x^2}{6} + C$ **(D)** None of these

**23.** If $\int \frac{2^{1/x}}{x^2} dx = K \cdot 2^{1/x}$, then $K$ is equal to:

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

**24.** If $\int \sec 2x\, dx = f[g(x)] + C$, then:

**(A)** $f(x) = \log|x|,\ g(x) = \tan\left(\frac{\pi}{4} - x\right)$ **(B)** $f(x) = \log|x|,\ g(x) = \cot\left(\frac{\pi}{4} - x\right)$

**(C)** $f(x) = \frac{1}{2}\log|x|,\ g(x) = \tan\left(\frac{\pi}{4} - x\right)$ **(D)** $f(x) = \frac{1}{2}\log|x|,\ g(x) = \cot\left(\frac{\pi}{4} - x\right)$

**25.** If $\int \frac{2^x}{\sqrt{1-4^x}}\, dx = k\, \sin^{-1}(f(x)) + C$ then:

**(A)** $k = \log 2,\ f(x) = 2^x$ **(B)** $k = \frac{1}{\log 2},\ f(x) = 2^x$

**(C)** $k = \log 2,\ f(x) = 4^x$ **(D)** $k = \frac{1}{\log 2},\ f(x) = 4^x$

**26.** $\int \frac{n\cos^{n-1} x}{(1+\sin x)^n}\, dx$ equals:

**(A)** $\frac{\cos^n x}{(1+\sin x)^n} + C$ **(B)** $\frac{\sin^n x}{(1+\sin x)^n} + C$ **(C)** $\frac{-\cos^n x}{(1+\sin x)^n} + C$ **(D)** $(\sec x + \tan x)^{-n} + C$

***27.** $\int \tan 2x\, \tan 3x\, \tan 5x\, dx = \log\left|\sec^a 2x\, .\, \sec^b 3x\, .\, \sec^c 5x\right| + K$. Then:

**(A)** $a, b, c$ are in H.P. **(B)** $a = b = c$

**(C)** $ab + bc + ca = 0$ **(D)** $a^{-3} + b^{-3} + c^{-3} = 3a^{-1}b^{-1}c^{-1}$

**28.** $\int \frac{e^x(1+x)}{\cos^2(xe^x)} dx =$

**(A)** $\tan(e^x) + x + C$ **(B)** $\cos(xe^x)$ **(C)** $\sec(e^x x) + C$ **(D)** $\tan(e^x x) + C$

**29.** $\int \frac{e^x dx}{(2+e^x)(e^x+1)}$ is:

**(A)** $(e^x+2)(e^x+1) + C$ **(B)** $\log\left(\frac{e^x+1}{e^x+2}\right) + C$

**(C)** $\frac{1}{2}\log\left(\frac{e^x+1}{e^x+2}\right) + C$ **(D)** $\log\left(\frac{e^x+2}{e^x+1}\right) + C$

***30.** If $\int \frac{\sqrt{x}\, dx}{\sqrt{1-x^3}} = \frac{2}{3} fog(x) + c$ then:

**(A)** $f(x) = \sqrt{x}$ **(B)** $g(x) = \cos^{-1} x$ **(C)** $f(x) = \sin^{-1} x$ **(D)** $g(x) = x\sqrt{x}$