Date Planned : __ / __ / __	Daily Tutorial Sheet – 14	Expected Duration : 90 Min
Actual Date of Attempt : __ / __ / __	Level – 2	Exact Duration :________

171. The value of $\int_a^b \frac{x^{n-1}\left((n-2)x^2+(n-1)(a+b)x+nab\right)}{(x+a)^2(x+b)^2}dx$ is equal to:

(A) $\frac{b^n+a^n}{2(a+b)}$ **(B)** $\frac{b^{n-1}-a^{n-1}}{2(a+b)}$ **(C)** $\frac{b-a}{2(a+b)}$ **(D)** $\frac{b^{n-1}-a^{n-1}}{2\left(a^n+b^n\right)}$

172. Number of values of x satisfying the equation $\int_{-1}^{\pi}\left(8t^2+\frac{28}{3}t+4\right)dt=\frac{\left(\frac{3}{2}\right)x+1}{\log_{(x+1)}\sqrt{x+1}}$, is:

(A) 0 **(B)** 1 **(C)** 2 **(D)** 3

173. The value of $\int_0^1\left(\prod_{r=1}^{n}(x+r)\right)\left(\sum_{k=1}^{n}\frac{1}{x+k}\right)dx$ equals:

(A) n **(B)** $n!$ **(C)** $(n+1)!$ **(D)** $n.\,n!$

174. If $x=\int_0^{t^2} e^{\sqrt{z}}\left\{\frac{2\tan\sqrt{z}+1-\tan^2\sqrt{z}}{2\sqrt{z}\sec^2\sqrt{z}}\right\}dz$ and $x=\int_0^{t^2} e^{\sqrt{z}}\left\{\frac{1-\tan^2\sqrt{z}-2\tan\sqrt{z}}{2\sqrt{z}\sec^2\sqrt{z}}\right\}dz$:

Then the inclination of the tangent to the curve at $t=\frac{\pi}{4}$ is:

(A) $\frac{\pi}{4}$ **(B)** $\frac{\pi}{3}$ **(C)** $\frac{\pi}{2}$ **(D)** $\frac{3\pi}{4}$

175. If $A_n=\int_0^{\pi/2}\frac{\sin(2n-1)x}{\sin x}dx$; $B_n=\int_0^{\pi/2}\left(\frac{\sin nx}{\sin x}\right)^2 dx$; for $n\in N$, then:

(A) $A_{n+1}=-A_n$ **(B)** $B_{n+1}=B_n$

(C) $A_{n+1}-A_n=B_{n+1}$ **(D)** $B_{n+1}-B_n=A_{n+1}$

176. Let $u=\int_0^1\frac{\ell n(x+1)}{x^2+1}dx$ and $v=\int_0^{\pi/2}\ell n(\sin 2x)dx$, then:

(A) $u=4v$ **(B)** $4u+v=0$ **(C)** $u+4v=0$ **(D)** $2u+v=0$

177. Let $I=\int_0^{\pi/2}\frac{dx}{1+\sin x}$, then $\int_0^{\pi}\frac{x^2\cos x}{(1+\sin x)^2}dx$.

(A) $-\pi^2$ **(B)** $\pi^2-2\pi I$ **(C)** $2\pi I$ **(D)** $2\pi I-\pi^2$

178. $\lim_{n\to\infty}\left[\left(1+\frac{1}{n^2}\right)^{2/n^2}\left(1+\frac{2^2}{n^2}\right)^{4/n^2}\ldots\left(1+\frac{n^2}{n^2}\right)^{2^n/n^2}\right]$

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

179. Evaluate $\int_0^{2\pi}\left\{\cos(x)\cos(2x)\cos\left(2^2x\right)\ldots\cos\left(2^{n-1}x\right)\cos\left(2^n-1\right)x\right\}dx$.

180. The value of $\left\{\lim_{n\to\infty}\sin\frac{\pi}{2n}.\sin\frac{2\pi}{2n}.\sin\frac{3\pi}{2n}\ldots\sin\frac{2(n-1)\pi}{2n}\right\}^{1/n}$ is equal to:

(A) 1/2 **(B)** 1/3 **(C)** 1/4 **(D)** None of these

181. The area founded by the curves $y=\cos^{-1}(\cos x)$, and $y=|x-\pi|$ is equal to :

(A) π^2 sq. units **(B)** $2\pi^2$ sq. units
(C) $\pi^2/2$ sq. units **(D)** None of these

182. A point 'P' moves in xy plane in such a way that $[|x|]+[|y|]=1$, where [.] denotes the greatest function. Area of the region representing all possible positions of the point 'P' is equal to :

(A) 4. sq. units **(B)** 16. sq. units **(C)** $2\sqrt{2}$ sq. units **(D)** 8. sq. units