ST. LAWRENCE HIGH SCHOOL

A JESUIT CHRISTIAN MINORITY INSTITUTION

FOR GOD AND COUNTRY

Worksheet-16

SUBJECT – MATHEMATICS

Pre-test

Chapter: Integration **Class: XII**

Topic: Properties of Definite integrals **Date: 27.07.2020**

Choose the correct option **(1 X 15= 15)**

1 The value of integral $\int_0^1 \frac{x^b - 1}{\log x} dx$ is

(A) $\log b$ **(B)** $2\log(b+1)$

(C) $3\log b$ **(D)** None of these

2 The value of the integral $\int_{-1}^{1} \frac{d}{dx}\left(\tan^{-1}\frac{1}{x}\right) dx$ is

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

(C) $-\frac{\pi}{2}$ **(D)** None of these

3 $\lim_{n\to\infty} \frac{1}{n} \sum_{r=1}^{2n} \frac{r}{\sqrt{n^2 + r^2}}$ equals

(A) $\sqrt{5}+1$ **(B)** $\sqrt{5}-1$

(C) $\sqrt{2}+1$ **(D)** $\sqrt{2}-1$

4 The derivative of $F(x)=\int_{x^2}^{x^3}\frac{1}{\log t}dt,\ (x>0)$ is

(A) $\frac{1}{3\log x}-\frac{1}{2\log x}$ **(B)** $\frac{1}{3\log x}$

(C) $\frac{3x^2}{3\log x}$ **(D)** $(\log x)^{-1}\cdot x(x-1)$

5 $\int_{-\pi/2}^{\pi/2}\sin^2 x\cos^2 x(\sin x+\cos x)dx=$

(A) $\frac{2}{15}$ **(B)** $\frac{4}{15}$

(C) $\frac{6}{15}$ **(D)** $\frac{8}{15}$

6 $\int_0^{\infty}\frac{dx}{\left(x+\sqrt{x^2+1}\right)^3}=$

(A) $\frac{3}{8}$ **(B)** $\frac{1}{8}$

(C) $-\frac{3}{8}$ **(D)** None of these

7 $\int_0^{\infty}e^{-2x}(\sin 2x+\cos 2x)dx=$

(A) 1 **(B)** 0

(C) $\frac{1}{2}$ **(D)** ∞

8 $\int_0^a x^4\sqrt{a^2-x^2}\,dx =$

(A) $\frac{\pi}{32}$ **(B)** $\frac{\pi}{32}a^6$

(C) $\frac{\pi}{16}a^6$ **(D)** $\frac{\pi}{8}a^6$

9 $\int_0^a x(2ax-x^2)^{\frac{3}{2}}\,dx =$

(A) $a^5\left[\frac{3\pi}{16}-1\right]$ **(B)** $a^5\left[\frac{3\pi}{16}+1\right]$

(C) $a^5\left[\frac{3\pi}{16}-\frac{1}{5}\right]$ **(D)** None of these

10 $\int_{-\pi/2}^{\pi/2}\sin^4 x\cos^6 x\,dx =$

(A) $\frac{3\pi}{64}$ **(B)** $\frac{3\pi}{572}$

(C) $\frac{3\pi}{256}$ **(D)** $\frac{3\pi}{128}$

11 $\int_0^1 \frac{d}{dx}\left[\sin^{-1}\left(\frac{2x}{1+x^2}\right)\right]dx$ is equal to

(A) 0 **(B)** π

(C) $\pi/2$ **(D)** $\pi/4$

12 $\int_0^{\pi} \sin^5\left(\frac{x}{2}\right) dx$ equals

(A) $\frac{16}{15}$ **(B)** $\frac{32}{15}$

(C) $\frac{8}{15}$ **(D)** $\frac{5}{6}$

13 $\lim_{n \to \infty} \left\{ \frac{1}{1-n^2} + \frac{2}{1-n^2} + \frac{3}{1-n^2} + \cdots + \frac{n}{1-n^2} \right\} =$

(A) 0 **(B)** $-1/2$

(C) $1/2$ **(D)** ∞

14 $\int_{\pi/4}^{3\pi/4} \frac{dx}{1+\cos x}$ is equal to

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

15 $\int_0^x f(t)dt = x + \int_x^1 t \quad f(t)dt$, then the value of $f(1)$ is

(A) $\frac{1}{2}$ **(B)** 0 **(C)** 1 **(D)** $-\frac{1}{2}$

Prepared by :-
SUKUMAR MANDAL (SkM).