



ST. LAWRENCE HIGH SCHOOL
A JESUIT CHRISTIAN MINORITY INSTITUTION



Solutions of Worksheet-12

SUBJECT – MATHEMATICS

Pre-test

Chapter: Integration

Class: XII

Topic: Method of substitution

Date: 24.06.2020

Choose the correct option

(1 X 15= 15)

1. If $\int \frac{dx}{x^2+a^2} = k \cot^{-1} \frac{x}{a} + c$, then the value of k is -

(A) a

(B) $-a$

(C) $\frac{1}{a}$

(D) $-\frac{1}{a}$

Ans. D

2. If $\int \frac{dx}{a^2-x^2} = \frac{1}{2a} \log|f(x)| + c$, then $f(x)$ is -

(A) $\frac{a-x}{a+x}$

(B) $\frac{a+x}{a-x}$

(C) $\frac{a-x}{a+x} + c$

(D) $\frac{a+x}{x-a} + c$

Ans. C

3. If $\int \frac{dx}{\sqrt{a^2-x^2}} = k \cos^{-1} \frac{x}{a} + c$, then the value of k is -

(A) 1

(B) -1

(C) $\frac{1}{a}$

(D) $-\frac{1}{a}$

Ans. B

4. The integral of the form $\int \frac{dx}{(px+q)\sqrt{ax^2+bx+c}}$ can be obtained by the substitution-

(A) $px + q = \frac{1}{z}$

(B) $ax^2 + bx + c = z^2$

(C) $ax^2 + bx + c = z$

(D) $px + q = \frac{1}{z^2}$

Ans. A

5. If $\int \frac{dx}{x^2-a^2} = k \log \left| \frac{x-a}{x+a} \right| + c$, then the value of k is -

(A) $\frac{1}{a}$

(B) $\frac{1}{2a}$

(C) $2a$

(D) None of these.

Ans. B

6. The value of $\int \frac{dx}{9x^2+4} = ?$

(A) $\frac{1}{2} \tan^{-1} \frac{3x}{2} + c$

(B) $\frac{1}{6} \tan^{-1} \frac{3x}{2} + c$

(C) $\frac{1}{6} \tan^{-1} \frac{2x}{3} + c$

(D) $\frac{2}{27} \tan^{-1} \frac{3x}{2} + c$

Ans. B

7. $\int \frac{dx}{(x-1)(x^2+1)} =$

(A) $\frac{1}{2} \ln(x-1) - \frac{1}{4} \ln(x^2+1) - \frac{1}{2} \tan^{-1} x + c$

(B) $\frac{1}{2} \ln(x-1) + \frac{1}{4} \ln(x^2+1) - \frac{1}{2} \tan^{-1} x + c$

(C) $\frac{1}{2} \ln(x-1) - \frac{1}{2} \ln(x^2+1) - \frac{1}{2} \tan^{-1} x + c$

(D) None of these

Ans. A

8. $\int \frac{(x^2 + x - 1)dx}{(x^2 + x - 6)} =$

- (A) $x + \ln(x + 3) + \ln(x - 2) + c$
 (B) $x - \ln(x + 3) + \ln(x - 2) + c$
 (C) $x - \ln(x + 3) - \ln(x - 2) + c$
 (D) None of these

Ans. B

9. $\int \frac{x^2 dx}{(x^2 + 2)(x^2 + 3)} =$

- (A) $-\sqrt{2} \tan^{-1} x + \sqrt{3} \tan^{-1} x + c$
 (B) $-\sqrt{2} \tan^{-1} \frac{x}{\sqrt{2}} + \sqrt{3} \tan^{-1} \frac{x}{\sqrt{3}} + c$
 (C) $\sqrt{2} \tan^{-1} \frac{x}{\sqrt{2}} + \sqrt{3} \tan^{-1} \frac{x}{\sqrt{3}} + c$
 (D) None of these

Ans. B

10. $\int \frac{dx}{(x^2 + 1)(x^2 + 4)} =$

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

Ans. C

11. $\int \frac{\sqrt{5 + x^{10}}}{x^{16}} dx$ is equal to

- (A) $-\frac{1}{75} \left(1 + \frac{5}{x^{10}} \right)^{3/2} + c$
 (B) $-\frac{1}{75} \left(1 - \frac{5}{x^{10}} \right)^{3/2} + c$
 (C) $\frac{1}{75} \left(1 - \frac{5}{x^{10}} \right)^{3/2} + c$
 (D) $\frac{1}{75} \left(1 + \frac{5}{x^{10}} \right)^{3/2} + c$

Ans. A

12. $\int \operatorname{cosec}^6 x dx$ is equal to

- (A) $-\cot x - \frac{\cot^5 x}{5} - \frac{2\cot^3 x}{3} + k$
(B) $-\frac{\cot x}{3} + \frac{2\cot^5 x}{5} + 2\cot^3 x + k$
(C) $\frac{\tan^3 x}{3} - \frac{\tan x}{5} + 2\tan^3 x + k$
(D) None of these

Ans. A

13. $\int (\sqrt{\tan x} + \sqrt{\cot x}) dx$ is equal to

- (A) $\sqrt{2} \sin^{-1}(\sin x + \cos x) + c$ (B) $\frac{1}{\sqrt{2}} \sin^{-1}(\sin x - \cos x) + c$
(C) $\sqrt{2} \sin^{-1}(\sin x - \cos x) + c$ (D) $\frac{1}{\sqrt{2}} \sin^{-1}(\sin x + \cos x) + c$

Ans. C

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

- (A) $\frac{1}{3} \left(1 + \frac{1}{x^2}\right)^{3/2} + c$ (B) $\frac{1}{3} \left(1 - \frac{1}{x^2}\right)^{3/2} + c$
(C) $-\frac{1}{3} \left(1 + \frac{1}{x^2}\right)^{3/2} + c$ (D) $-\frac{1}{3} \left(1 - \frac{1}{x^2}\right)^{3/2} + c$

Ans. C

15. $\int \frac{1}{x^2(x^4+1)^{3/4}} dx$ is equal to

- (A) $\left(1 + \frac{1}{x^4}\right)^{1/4} + c$ (B) $-\left(1 + \frac{1}{x^4}\right)^{1/4} + c$
(C) $-\left(1 - \frac{1}{x^4}\right)^{1/4} + c$ (D) $\left(1 - \frac{1}{x^4}\right)^{1/4} + c$

Ans. B