

SNS ACADEMY

CLASS – XII

MATHEMATICS

ASSIGNMENT NO. 6

INTEGRALS,

Evaluate the following Integrals :-

1. $\int \sec^2(2-3x)dx$

2. $\int \frac{\sin(2-ex)}{\cos^2(2-3x)}dx$

3. $\int e^{2a-3}dx$

4. $\int \sec(2-3x)dx$

5. $\int \frac{1}{\sqrt{4x+1}}dx$

Evaluate the following integrals :- (Hint : Express numerator in terms of denominator)

(i) $\int \frac{x-1}{x+1}dx$

(ii) $\int \frac{x^2-1}{x^2+1}dx$

(iii) $\int \frac{x}{(2x+1)^2}dx$

(iv) $\int \frac{x^4-1}{x^2+1}dx$

(v) $\int \frac{x^2}{x+1}dx$

(vi) $\int \frac{x^3}{(x+1)^2}dx$

Evaluate the following Integrals :- (Hint : Use $\int [f(x)]^n f'(x)dx = \frac{[f(x)]^{n+1}}{n+1} + c$)

(i) $\int \frac{(\sin^{-1} x)^3}{\sqrt{1-x^2}}dx$

(ii) $\int \sec^4 x \tan x dx$

(iii) $\int \frac{\log^n x}{x}dx$

(iv) $\int \frac{x}{(x^2+1)^3}dx$

(v) $\int \sin^5 x \cos x dx$

Evaluate the following Integrals :- (Hint : Use $\int \frac{f'(x)}{f(x)}dx = \log If(x) + c$)

(i) $\int \frac{x^3}{1+x^4}dx$

(ii) $\int \frac{e^x - e^{-x}}{e^x + e^{-x}}dx$

(iii) $\int \frac{e^x + 1}{e^x - 1}dx$

(iv) $\int \frac{x^3}{(x^2+1)^2}dx$

(v) $\int \frac{\tan x + 1}{\tan x - 1}dx$

(vi) $\int \frac{\sec x}{\log(\sec + \tan x)}dx$

Evaluate the following integrals

(Hint – apply trig. Formulae to convert product form of the integrand into sum:-

(i) $\int \sin 2x \sin 3x dx$

(ii) $\int \sin 2x \cos 4x \cos 5x dx$

(iii) $\int \sin^2 x \cos^2 x dx$

Integration by substitution

Evaluate

(i) $\int \frac{x^2}{1+x}dx$

(ii) $\int \frac{dx}{x + \sqrt[3]{x}}$

(iii) $\int \frac{x^2}{\sqrt{1+x}}dx$

(iv) $\int \sqrt{\sin \theta} \cos^3 \theta d\theta$

(v) $\int \sin^3 x \cos^4 x dx$

(iii) $\int \sin^5 x dx$

Evaluation of integrals of various types based on formulae

(i) $\int \frac{dx}{x^2+x+1}$

(ii) $\int \frac{dx}{1-4x-2x^2}$

(iii) $\int \frac{dx}{x^2+6x+1}$

$$(iv) \int \frac{3x+1}{\sqrt{3^2+4x+1}} \quad (v) \int \frac{dx}{3\sin^2 x + 4\cos^2 x} \quad (vi) \int \frac{dx}{4+5\sin x} \quad (vii) \int \frac{x^2+1}{x^4+1} dx$$

Integration by parts :-

$$(i) \int x \sec^2 x dx \quad (ii) \int \sin^{-1} x dx \quad (iii) \int x e^x dx \quad (iv) \int \log x dx$$

$$(v) \int \sec^3 x dx \quad (vi) \int e^x \sin x dx$$

Integration by partial fraction

$$(i) \int \frac{x^2 dx}{(x-1)(2x+3)} \quad (ii) \int \frac{(x-1)dx}{(2x+1)(x-2)(x-3)} \quad (iii) \int \frac{dx}{x^3+1}$$

$$(iv) \int \frac{x^2 dx}{x^4-1} \quad (v) \int \frac{dx}{4+5\sin x}$$

definite Integral

$$(i) \int_1^2 1x dx \quad (ii) \int_4^3 1x^2 - 4 dx \quad (iii) \int_0^{\pi/2} \frac{\sqrt{\sin x} dx}{\sqrt{\sin x} + \sqrt{\cos x}}$$

$$(iv) \int_0^{\pi} \frac{x}{1+\cos^2 x} \quad (v) \int_0^{\pi/2} \log \sin x dx \quad (vi) \int_{-1}^{+1} \log\left(\frac{2-x}{2+x}\right) \sin^2 x dx$$

Q7. Evaluate $\int_a^b x^2 dx$ using limit of a sum formula (f) $\int_0^2 e^{3x+1} dx$ evaluate as limit of sum.