

FAQ's

1. What do you mean rational function?

Answer:

A rational function is the one which is the quotient of two polynomials

Example:

$$\frac{1}{1-x^2}, \frac{x^3}{1+x^2}$$

2. List the methods to accomplish indefinite integrals

Answer:

- I. Polynomial division.
- II. Partial fraction expansion.
- III. Term by term integration

are the methods available to accomplish indefinite integrals.

3. Evaluate $\int_0^1 \frac{\sin^{-1} x}{x} dx$

Answer:

Put $\sin^{-1} x = \theta$ or

$x = \sin \theta$ so that $dx = \cos \theta d\theta$

Also when $x=0$, $\theta=0$; when $x=1$ $\theta = \frac{\pi}{2}$

$$\text{Therefore } \int_0^1 \frac{\sin^{-1} x}{x} dx = \int_0^{\frac{\pi}{2}} \frac{\cos \theta}{\sin \theta} d\theta$$

$$= [\theta \cdot \log \sin \theta]_0^{\frac{\pi}{2}} - \int_0^{\frac{\pi}{2}} 1 \cdot \log \sin \theta d\theta$$

$$= \int_0^{\frac{\pi}{2}} \log \sin \theta d\theta = -\left(-\frac{\pi}{2} \log 2\right) = \frac{\pi}{2} \log 2$$

4. List the sphere involved is integration by partial fraction.

Answer:

The method of integration of the fraction $\frac{p(x)}{q(x)}$, where the degree of numerator is less than the degree denominator involves the steps given below.

I. Factorize $q(x)$ into a product of real linear or quadrant factor.

II. Write $\frac{p(x)}{q(x)}$ as a sum of simple partial fraction.

5. List the properties of definite integrals

Answer:

i.
$$\int_a^b f(x)dx = -\int_b^a f(x)dx$$

ii.
$$\int_a^b f(x)dx = \int_a^b f(u)du$$

iii.
$$\int_0^a f(x)dx = \int_0^a f(a-x)dx$$

iv.
$$\int_a^b f(x)dx = \int_a^b f(a+b-x)dx$$