INTEGRATION

Integration is basically just the advanced summation of stuff

BASIC RULES OF INTEGRATION

Linear functions

1.

2.

3. When sum of several terms is integrated the result

is the sum of the integrals of the separate terms. For

example,

Trigonometric functions

Exponential and logarithmic integrals

Integration by partial fractions

Integration by substitution

Integration by parts: In this type of integration, the two or three variables are not derivatives of each other

Normally, from the basic calculus knowledge of differentiation,

If we integrate both sides,

Another formula for the integration by parts

Example 1

Find

let ,

let ,

Applying the formula

Integral of the form

INTEGRATION BY PARTIAL FRACTIONS

When resolving into partial fractions, after the denominators have been factorized, if there is a quadratic factor, then the quadratic factor (which will be a denominator in the partial fraction) will have a linear numerator (a + bx). From the basic knowledge of partial fractions, we know that for a linear denominator, we will have a constant numerator. For a quadratic denominator, we will have a linear numerator as well. So on and so forth.

IMPROPER INTEGRALS

When you see infinity in the upper or lower limit of an integral, it is called an improper integral

Given an integral in the form:

If you get a finite number as your answer, then that integral is convergent. However, if you gen an infinite answer like the integral is said to be divergent

Steps to solving improper integrals

1. Replace infinity with some variable (t)

2. Express the integral as a limit

3. The anti-derivative of is

Therefore, the integral is said to be **DIVERGENT**.

Integral of P-series

Given an integral in the form:

If p>1, the integral is convergent

If p<= 1, the integral is divergent

Looking at an example

Answer: convergent 1/12 I think :)

Reduction Formula for sine

For example

Solve

Reduction Formula for cosine

Prove the reduction formula

To prove this, we will use integration by parts

Using the reduction formula, solve the question

Answer:

Solving some questions on integration

1.

Solution:

Answer:

2.

Solution:

Answer: