



First Principle of Integration

53. Mara

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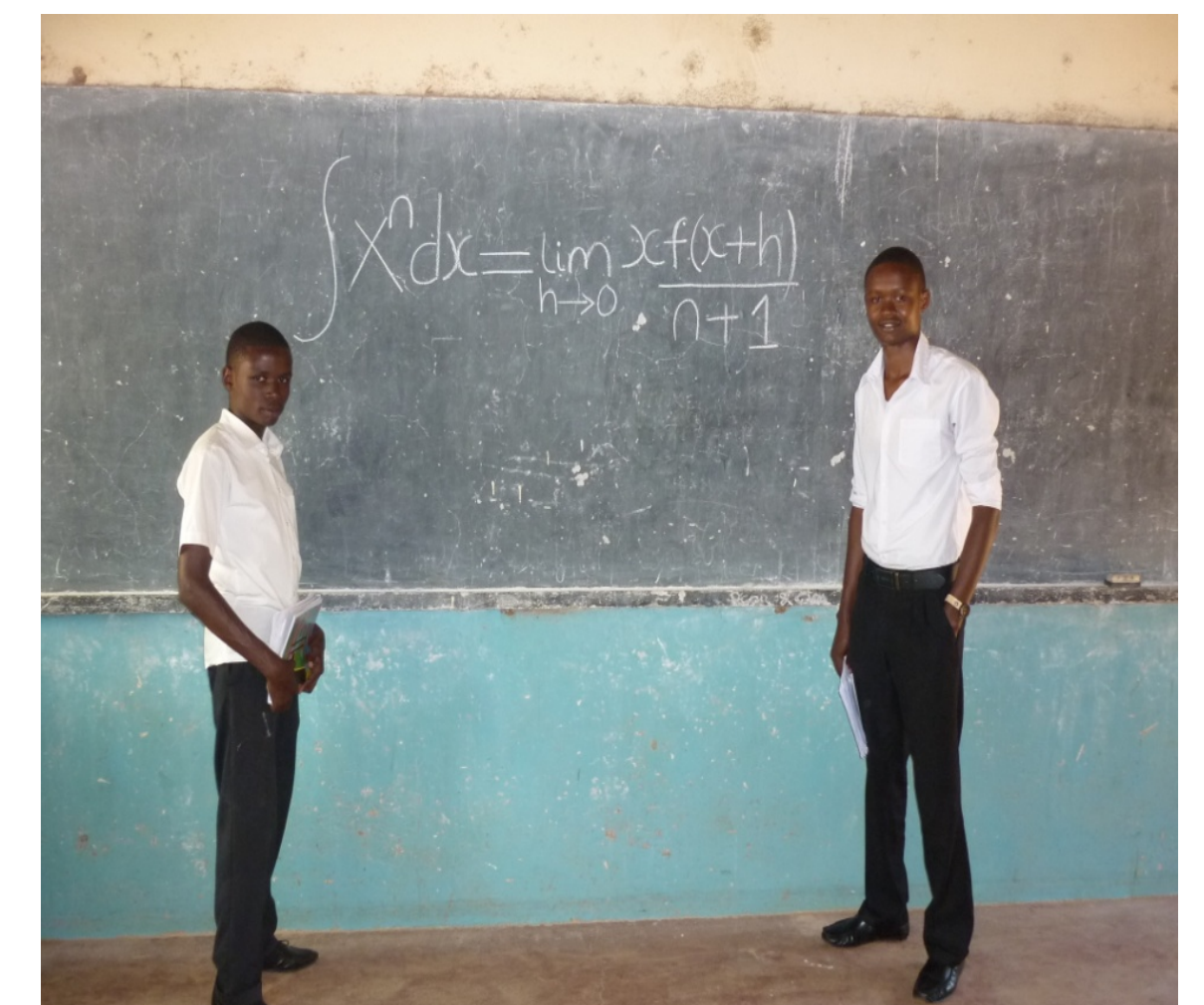
Introduction:

J.K. Backhouse and S.P.T. Huoldsworth (1985 p106) started that integration is the inverse of differentiations. In differentiation there is first principle of differentiation which we could not find the first principle of integration. Since the two topics are the first reverse of each other, we expected to have the first principle of integration and it's for this reason we wanted to derive the formulary which will be the first principle of integration.

General objective of the project

To derive the new formula of integration (first principal of integration)

Specific objective of the project: To solve various integration questions



Method:

(i) From the general formula of integration the new formula of integration (first principal of integration) was derived.

(ii) Then the new formula (first principal of integration) was presented to student to see if they can understand it.

(iii) Student who were taught the formula we given questions to see if they can solve questions using the formula that had been presented to them in step (ii) above.



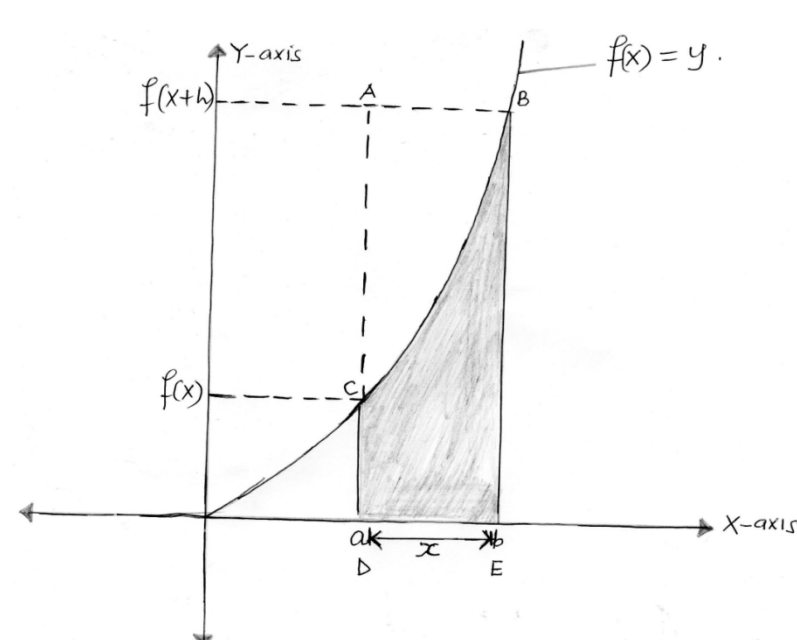
$$\int x^n dx = \lim_{h \rightarrow 0} \frac{xf(x+h) + C}{n+1}$$



Results:

DERIVATION OF THE FIRST PRINCIPLE INTERGRATION (FORMULAR)

Whereas differentiation is concerned with finding the gradient of a curve at a given point, Integration is concerned with finding the area under a curve between two points e.g.: given the function $y = x^n$



Question Number	Questions Categories	W	R	Total
1	Linear	01	19	20
2	Linear	05	15	20
3	Quadratic	03	17	20
4	Exponential	20	00	20
5	Exponential	20	00	20

Using **old** formula to solve the questions

Question Number	Questions Categories	W	R	Total
1	Linear	01	19	20
2	Linear	09	11	20
3	Quadratic	01	19	20
4	Exponential	10	10	20
5	Exponential	10	10	20

Using the **new** formula to solve the questions

Differentiation = slope

Slope AB=?

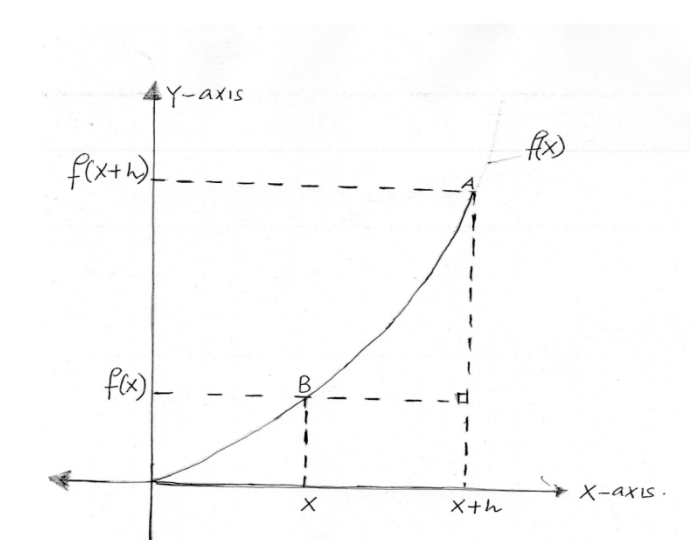
A (x+h, F(x+h)) B (x, F(x))

Slope AB = $\frac{\Delta Y}{\Delta X} = \frac{Y_2 - Y_1}{x_2 - x_1}$

Slope of AB = $\frac{F(x+h) - F(x)}{x+h - x}$

Slope of AB = $\frac{F(x+h) - F(x)}{h}$

$F'(x) = \lim_{h \rightarrow 0} \frac{F(x+h) - F(x)}{h}$



From the derived formula student whom the formula was presented were given an exam to test if the formula was understood, easy to use, and the strength of the formula I comparison to the old formula and the result of the test was as follows.

The total number of student who were present in the exam were 20 students, and to them were given questions of various categories to conduct which require them to use the both the old formula and the new formula. Categories of questions

There were three (3) question categories which are: Linear, Quadratic, Exponential

The total number of question was five (5)

The total number of question is represented by the word **Total**

The number of student who got the answer **wrong** is represented by letter **W**

The number of student who got the answer **right** is represented by letter **R**

Conclusions

From the result obtained we can sum up as follows

(i) The new formula created is more advance than the old formula this is because the old formula can not solve some of the question as it can be seen from the two tables above under the category of exponential in which all student got wrong the questions when using the old formula but 50% of student were able to get right the questions when using the new formula.

References

J.K.Back house and S.P.T. Houldsworth (1979) *Pure Mathematics a First Course* , 1st Edition , Longman Group.