M - 23

SERIES " H154M " AS A UNIT AREA OF THE REGION BETWEEN THE LINES AND CURVES

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Abstract

This world events consciously or not realize everything has a pattern, until the events of the universe according to the Big Bang theory of the solar system which makes so regular in the rotation . The author would like to create a results curve area between the quadratic function $y = kx^2$ and line $y = ka^2$ using GeoGebra application version 4.2 . This paper can provide a series that is no less interesting with Fourier series , so that will add new material about the series can be calculated with sigma notation . In addition, the ranks of the unique natural numbers of extensive changes in established areas. Finally, this paper provides analytical and geometric proof of the vast area in between the lines and curves that give the area is formed by y = *ka* dan kurva y = kx^2 , x-axis , line $x = \sqrt{a}$ dan $x = -\sqrt{a}$ make a series of numbers for *k* = 1 and a ∈ original numbers.

$$\sum_{i=0}^{n} \frac{4n\sqrt{n}}{3} = 0 + \frac{4}{3} + \frac{8\sqrt{2}}{3} + 4\sqrt{3} + \cdots + \frac{4n\sqrt{n}}{3}$$

The author calls the series “H154M”
.

Keyword - sequence , series , sigma notation

CHAPTER I. INTRODUCTION

A. BACKGROUND

Learning is a process of interaction between student with educators and learning resources in a learning environment . In other words , learning is a process to help a student to learn well (Wikipedia) . The main purpose of learning processes in order to reach the learning objectives . The main purpose is a success of students learning in a subject or education generally (Krismanto, 2003).

One of the characteristics is mathematics has an abstract object. The abstract nature of perception causes many of the mathematical symbols that give a broader meaning than we know . Therefore , the low mathematics achievement of students caused by factors that learners have problems comprehensively or partially in mathematics .

According to a survey of some educators , there are many misconceptions encountered high school math teacher to Content Sigma notation , the number sequence . In this article , discuss thoroughly the series of numbers that describe the series " H154M " to present a series of numbers which is more attractive than the Fibonacci sequence and Forrier .

Researchers conduct initial observations through interviews with teachers of mathematics and some instructors who have experienced a lot in his field . In fact, the researchers themselves independently invented the concept of the series , there is a formula that

has been presented to the reader , so the researchers involved in discovering the basic concept is a good way to understand abstract mathematical concepts (Herbst, 2006).

Researchers create a model arithmetically " H154M " formed from integers spontaneously from everyday experiences in using GeoGebra application instructions explicitly and implicitly of the school , and Figure contained books on mathematics (Hasegawa, 1997). In this regard , this study becomes meaningful if the real life experience of events linking the world with ideas or mathematical concepts in the process of the invention is the idea works . In addition , the importance of applying the concept of mathematics which was owned by researchers in daily life or other fields .

Therefore , a researcher saw an unique relationship between the sequence numbers which are formed from an area of the region bounded by the curves and lines . Sequence number will be established by the sigma notation and form of the formula to be proved by mathematical induction

B. FORMULATION PROBLEM

Based on the description on the background of this problem can be formulated as follows .

1 . How to shape a series of numbers that occur by the extent of the area formed by the lines and curves ?
2 . Is the sequence number is to be made sigma notation or formula proved by mathematical induction ?

C. PURPOSE OF RESEARCH

Based on the formulation of this problem , a research objectives are as follows .

1 . To find out how the numbers that formed a unique sequence or sequences using GeoGebra application .
2 . To create a series of numbers that can be made sigmanya notation or formula proved by mathematical induction .

D. BENEFIT RESEARCH

1 . For students : Students get new material that sequence of numbers sequence " H154M " . So that facilitate students in solving problems using integral wide .
2 . For the teacher : The teacher has a way of how to make a scientific paper that benefit PKG and PKB for promotion and improvement of a quality of teachers .
3 . For schools : obtaining the material development of a series and the new series " H154M "

CHAPTER II LITERATURE

A. TEACHING MATH

Gagne (Pribadi, 2009) defines that the term learning as " a set of events embedded in purposeful activities that facilitate learning " . Learning is a series of activities that deliberately created with the intention to facilitate the learning process . Therefore, the use of GeoGebra applications help to simplify or summarize a series of activities without losing an essence of the material's content.

The area who are formed by the curves and lines are summarized in Integral material is part of the high school class XII mathematics matter either majoring in science and social studies and mathematics as well as part of one of the basic science , today has grown rapidly both meteri and usefulness . Material integral function describe symbolizes communication skills with numbers and symbols as well as the sharpness of reasoning that can provide clarity

and solve problems in everyday life .

From the above discussion it is clear that life would continue to evolve in accordance with developments in science and technology . Therefore students should have the ability to acquire , select and manage information to survive the ever-changing circumstances . This capability requires critical thinking , systematic , logical , creative and ability to work together effectively . Thus , the teacher must continue to follow the development of mathematics and always trying to be creative in their lessons so that students can bring in the desired direction (Suyanto, 2005). This supports the use of GeoGebra application in calculating the total area formed by the curves and lines .

B. APPLICATION OF GEOGEBRA

The technology can be used to support learning , both of hardware and software . One of the software which is used GeoGebra potential . GeoGebra is a fairly complete software aids used in abundance and wide . The name is short GeoGebra geometry and algebra. Despite of the name refers only to geometry and algebra is not only supports applications for both of these topics , but also supports a lot of mathematical topics beyond both. GeoGebra first developed by Markus Hohenwarter of Austria and released as open source software that can be used free of charge and free to be developed as cited in (Muh. Tamimuddin H dkk, 2013) .

As there are several advantages of GeoGebra application that is easy to use application , is full of features for learning mathematics , supporting web platform, supporting a variety of operating systems , available in multiple languages , and is provided free of charge . Therefore , the use of the application is needed in order to make the learning more meaningful information . This is consistent with Ausubel in (Hudojo, 1988) is said to be significant in the study that will be studied information prepared in accordance with the learners' cognitive structure of learners so that the learners can associate new knowledge with its cognitive structure. Ausubel also argues that meaningful learning by discovery, the information learned, freely determined by learners . Learners are then connect the new knowledge to the cognitive structure owned . For example, students were asked find the properties of a square . By linking existing knowledge, such as the properties of a rectangle, the students may find themselves the properties of a square .

Screen's useful to make math learning relevant documents , for example for the preparation of teaching materials , learning modules , papers , presentation materials etc. . For example GeoGebra geometry used for painting . The resulting figure can be copied into other applications such as word processing applications to (eg MS Word) , presentation applications (eg MS Powerpoint) , or other applications for further processing so as to provide a new material , especially in the series of numbers effectively and efficiently .

GeoGebra is often referred to as the worksheet or worksheets , that have the file extension GGB . This file can be searched on the internet with a web site that contains a fairly complete screen's media is GeogebraTube.org . We can search and download files from the web site of the GGB easily by entering the keywords of the media who wish to find out (Tamimuddin HM, 2011).

The screen's search step GeogebraTube media are as follows :

1 . Open GeogebraTube site located at geogebratube.org .
2 . Do a search by typing keywords related to the theme mentioned in the search field . We recommend using keywords in English given the amount of content in Indonesian language are still relatively few . For example if we want to find the area of a circle about the media then you should use the keyword ' area of circle' . If you have difficulty in translating words or sentences Indonesian to English, you can use an online translator toolkit such as

Google Translate (translate.google.com) .

3 . Search results for the keywords you entered will appear with each page by default will load 10 search results . We can change the number of search results into 20 , 30 or 50 results per page . Moreover we can determine whether the sorting criteria based on relevance , date , title and rating by selecting the option in the Sort by . In the meantime let the settings as they are.

4 . Choose one of the search results by clicking on the thumbnail or the link so it will look more complete information about the media .

5 . To display media online click on the Go to Student Worksheet button that will open a new page that contains the display screen's intended media .

6 . In addition to online display , the screen's media can also be downloaded so that it can be displayed locally without having to connect to the internet . Downloaded files have the extension . GGB and will be run using the screen's previous application must already be installed on the computer .

C. USE OF SLIDER

One of the screen's advantages is its ability to dynamically figures and chart is by including certain parameters . Furthermore, the parameters can be changed dynamically in which at the same time by the screen's diFigure graph will change with the value of the parameter . As an example , we will create a graph of the equation y = mx + line with the value of c m and c we change dynamically using the slider . Manufacturing steps are as follows :

Tools	**Type on menu bar**	**Explanation**
	m=1	Determine the value of the variable m.
		M variables appear on the graphic display by clicking on the small circle to the left of m (in the view of algebra)
Slider		Creating slider slider Give the name of the slider with the name c
	y=mx+c	Creating a line with the equation *y=mx+c*
Move		Move Select Move icon and then move the slider to change the value of m and c Consider what changes occur in the line.

Table 1 . Steps to make the slider

For further explanation of the use of the slider can be seen on the show in practice the use of the slider in the youtube link : http://www.youtube.com/watch?v=5s_Wp11pToQ&feature=player_embedded # t = 0

GeoGebra menu bar located at the top of the menu consists of the File , Edit, Options, Tools, Window and Help. Underneath there is a toolbar that contains a menu to build , describe, measure and manipulate objects. In each category there are several other tools Toolbar is hidden, to show them we can click the small arrow in the bottom right of each box tool in the Toolbar .

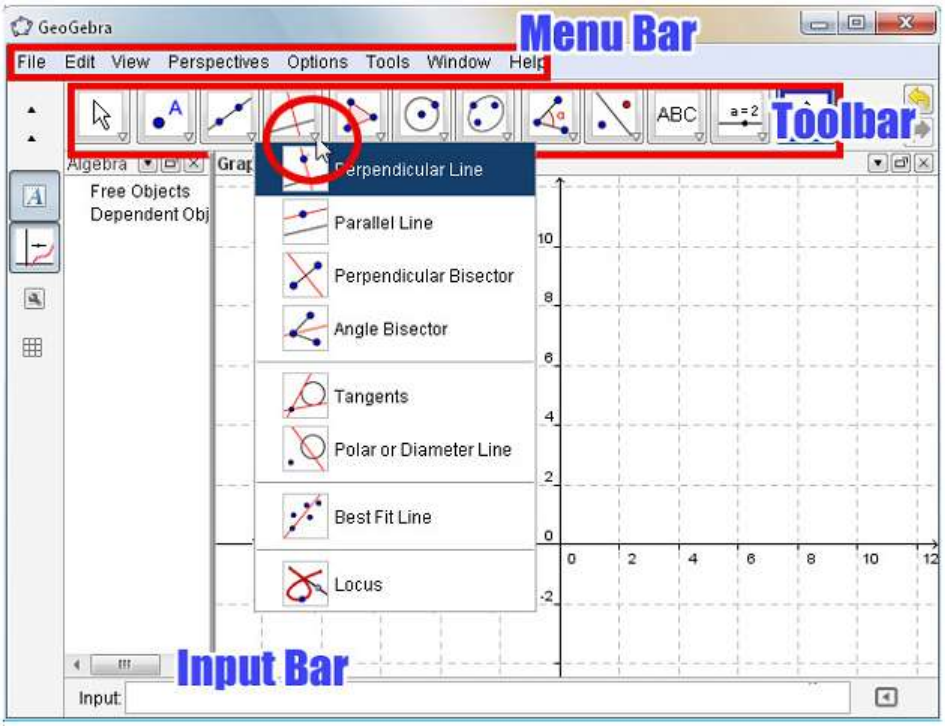


Figure 1 . Screen's menu bar

While the slider is in the column to the toolbar with icons line a = 2 .

D BROAD AREA INTEGRAL

In the calculation of the area using the integral , we have to understand first integral formulas and completion techniques as follows :

1) Many Formula Integral Function Of Simple Algebra

1. $\int dx = x + c$
2. $\int a\,dx = a \int dx = ax + c$
3. $\int x^n\,dx = \frac{1}{n+1} x^{n+1} + c$
4. $\int [\, f(x) \pm g(x) \,]\,dx = \int f(x)\,dx \pm \int g(x)\,dx$

2) Mechanical completion Integral Form

If the integral form : : $\int u\,v\,dx$, with u and v respectively, are functions of the variable x , while the Integration technique that can be used are of two kinds , namely :

1. substitution method
   if u and v have a relationship , ie v dx = du
2. Partial methods with TANZALIN
   If u and v do not have a relationship , ie v du dx ?

In addition to the integral algebra, formulas are also provided trignonometri integral sine, cosine, tangent , secant and cosecant , and combinations of them like the breakdown as follows :

1) Many Integral Formula of Simple Trig Functions

1. $\int \sin ax\,dx \quad = -\frac{1}{a} \cos ax + c$

2. $\int \cos ax\, dx = \frac{1}{a} \sin ax + c$
3. $\int \sec^2 ax\, dx = \frac{1}{a} \tan ax + c$

Note that the commonly used trigonometric Identity

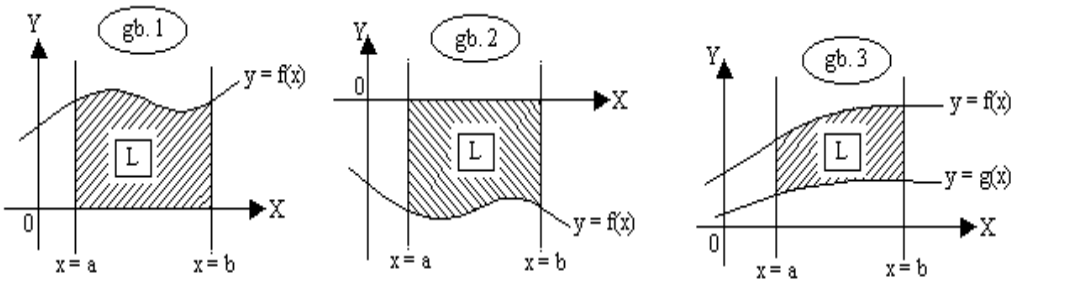
a. $2\sin A \cdot \cos B = \sin(A + B) + \sin(A - B)$
b. $-2\sin A \cdot \sin B = \cos(A + B) - \cos(A - B)$
c. $\text{Sin}^2 A + \cos^2 A = 1$
d. $\sin^2 A = \frac{1}{2}\{1 - \cos 2A\}$
e. $\cos^2 A = \frac{1}{2}\{1 + \cos 2A\}$
f. $\sin 2A = 2\sin A \cdot \cos A$

In addition to measuring the area , Indefinite integral equation used to search for a curve y = f (x) if known first derivative and a point on the curve that is: $f(x) = \int f'(x)\, dx$, with f ' (x) is the first derivative of f (x) or $y = \int \frac{dy}{dx} dx$, the first derivative is y (Keisler, 2000), for example : gradient of a tangent curve is m = y' = 2x - 3 . The curve through the point (3,2) . Therefore , we can determine the equation of the curve with a slope integrate functions and constants obtained from the substitution point to Integration results thus obtained $y = x^2 - 3x + 2$.

Suppose the curve y = f (x) is continuous on a closed interval [a, b] , then the area bounded by the curve L y = f (x) , the X-axis , the line x = a, and the line x = b , is determined by the formula :

$L = \int_a^b f(x)dx = [F(x)]_a^b = F(b) - F(a)$, with F(x) is the integral (antidiferensial) of f (x)

In Calculating Regional Area we should make preliminary sketches Figure Figure - given or served , then we conclude that the requested areas such as the following description :



gb. 1 dan gb 2. Luas daerah yang dibatasi oleh: kurva y = f(x), sumbu X, grs x = a, dan grs x = b

gb 3. Luas daerah yang dibatasi oleh: kurva y = f(x), y = g(x), grs x = a, grs x = b

Figure 2 . The total area under or between two curves

a. The Area L on figure 1

$L = \int_a^b f(x)dx$,

untuk $f(x) \geq 0$

b.The area L on figure 2

$L = -\int_a^b f(x)dx$, atau

$L = \left|\int_a^b f(x)dx\right|$ untuk $f(x) \leq 0$

c. The area L on figure 3

$L = \int_a^b \{f(x) - g(x)\}dx$,

dengan $f(x) \geq g(x)$

With extensive if the record is only limited by the two curves and quadratic shape functions , then it can be extensive search using the formula :

L = $\frac{D\sqrt{D}}{6a^2}$, with D = determinant of the quadratic equation (f (x) - g (x))

E. CONCEPT OF SEQUENCES AND SERIES

Rows that we often encounter is the arithmetic and geometric sequence U_1 , U_2 , U_3 , ... , U_n is a sequence of numbers that have special characteristics as follows:

Sequence	Main caracteristic	Formula part–n	central part	Inserts k numbers
Aritmetika	Beda $b = U_n - U_{n-1}$	$U_n = a + (n-1)b$	$U_t = \frac{1}{2}(a + U_{2k-1})$, *k* lies the middle term, the number of terms 2k–1	$\mathbf{B}_{new} = \frac{y-x}{k+1}$
Geometri	Rasio r = $\frac{U_n}{U_{n-1}}$	$U_n = ar^{n-1}$	$U_t = \sqrt{a \cdot U_n}$, with t = ½(n + 1)	$R_{new} = \sqrt[k+1]{\frac{y}{x}}$

Table 2 . Formulas in arithmetic and geometry

With the following note :

1 . x and y are two numbers that will be inserted k numbers

2 . U_1 = a = first term of a sequence

3 . In the arithmetic sequence applies Um - Uk = (m - k) b

Suppose given a problem that tribe 4th and 9th an arithmetic sequence are respectively 110 and 150 . 30th tribal arithmetic sequence is obtained by means of the formula of elimination - substitution sequence in order to get a = 86 and b = 8 . Therefore , all 30 parts of the sequence is 318 .

As for the arithmetic and geometric series $U_1 + U_2 + U_3 + ... + U_n$ is the sum of sequential (sequence) of a row with the following special features :

Sequence number of the first n terms

Arithmetic Sn = n (a + Un) and Un ..... if a known

= N (2a + (n - 1) b) ..... if a and b are known

Geometry Sn = ... if r > 1

= ..... If r < 1

Series	Sequence number of the first n terms

Aritmetika	$S_n = \frac{1}{2}n(a + U_n)$ …… if a and U_n are known $= \frac{1}{2}n(2a + (n-1)b)$ ……..if a and b are known
Geometri	$S_n = \frac{a(r^n - 1)}{r - 1}$ …… if r > 1 $= \frac{a(1 - r^n)}{1 - r}$ ……if r < 1

Table 3 . Arithmetic series formulas and Geometry

With Notes as follows :

1 . Between the n and the series there is a relationship that is :

Un = Sn - Sn - 1

$U_1 = a = S_1$

2 . There are infinite series is a geometric progression :

- $S_\infty = \frac{a}{1 - r}$

Suppose given a problem that is known both tribal and sixth parts of a geometric series with positive terms , respectively, 6 and 96 . The number of the first five terms of the sequence obtained by eliminating substitute formulas and geometric series obtained a = 3 and r = 2 so that the number of first five terms is 93 .

CHAPTER III RESEARCH METHODOLOGY

A. SCOPE OF RESEARCH

Subjects to be studied , or the sample to be studied is a case study on the change of the regular numbers on the area between the lines and curves using GeoGebra application version 4.2 . The curves are referred to in this research is a quadratic function or parabola curve . While the material presented is broad use integral Integral material .

The research is focused on the area bounded by lines and curves only with literature review texbook and online library . Therefore , for the vast between the two curves will be discussed in further research in the near future .

Researchers conducted a literature review on the books related to mathematics and consultation with several speakers math book makers in the country such as Madame math agencies and private institutions such as the issuer grants, as well as tutoring Ganesha Operation .

B. PROCEDURES USED

Writing Scientific collaboration is carried out . In fact contains four steps : planning , implementation , evaluation and reflection .

1. planing

Reviewing the draft materials prepared Integral Materials , Materials Rows and rows , study the problems associated with the data types of planning emphasis here is to prepare the script really prepared to answer questions research problems .

Preparing media GeoGebra application form to calculate the area using the integral ; Fill in this form of application program dynamically display area extents .

2. implementation

Researchers writing a script to consult with the author of the national speakers accommodate all the problems that arise after the material has been given previously extents .

Issues discussed along with models based on literature review and interviews via BBM with Mr. Sukino of grants . If problems arise from the material content of the series , then the solution is done by finding out from the speakers earlier .

To clarify or reinforce the study material given 2 simulation is the first simulation based applications GeoGebra and the Figure of the second simulation is based on the basic integral formula .

Researchers decipher about the series using sigma notation concept . In this activity, the researchers tried to find a regular number .

At the completion of the series formula " H154M " using mathematical induction proof so as to produce a new formula .

Researchers make any counting in newsprint or blank paper.

3. evaluation

Researchers looked at whether there are numbers stating the extent that form a unique sequence or sequences using GeoGebra applications that are not less interesting with forier series and Fibonacci series .

Researchers observed on each number that is generated from the tribe began the first (a) to the last term (Un) . Starting from the problems that arise at the beginning of the planning up to the making of this work .

Finally, the researchers tested whether the sequence number is to be made sigma notation or formula proved by mathematical induction .

4. reflection

Collaborative teachers and consultants analyze the observations and the series " H154M " . Next create a reflection , making conclusions or hypotheses while .

Discuss the results of the analysis based on the observation indicator scope of the study . Creating a draft of the revised corrective action or achievement based on the analysis of these indicators .

CHAPTER IV RESULTS AND DISCUSSION

A. DESCRIPTION OF RESEARCH

One of the challenges in teaching the students about the geometry of the area under the curve or in between the two is that the student does not have a context . As a math teacher , should use contexts to relate the abstract concepts of the material that will be discussed with examples in everyday life to help students in understanding the material. This is the weakness of students who are still at the stage of thinking in the theory of Van Visual Hielle .

This section will discuss alternative methods in determining the area under the curve or in between 2 . This series is called the series " H154M " because the method of calculation and imagination using specially designed by the author . Note the rectangle below with 2a is the length of the rectangle , ka is the width of the rectangle , and d is the area formed by the line y = ka and the curve y = x axis is limited kx^2 line x = $\sqrt{a}$ and x = - $\sqrt{a}$.

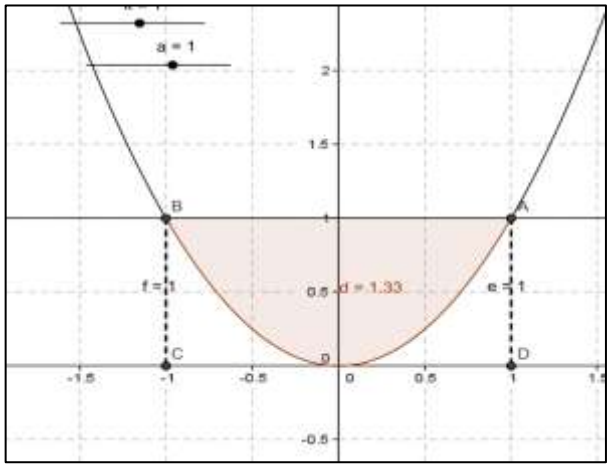


Figure 3 . Wide area between the curve and the line

In the Figure above takes the value a = 1 and k = 1 using GeoGebra with Integral formula obtained breadth is 4/3 unit area or unit area 1.33 .

Analytically the area mentioned above can also be proved using the integral formula :

$$\text{Area} = \int_{-1}^{1} 1 - x^2 dx$$
$$= \left[x - \frac{1}{3}x^3\right]_{-1}^{1}$$
$$= \left[\left(1 - \frac{1}{3}\right) - \left(-1 + \frac{1}{3}\right)\right]$$
$$= \frac{4}{3} \text{ unit area}$$

Or by using other way is Area's Formula

$$\text{Area} = \frac{D\sqrt{D}}{6a^2} \quad \text{, dengan } D = b^2 - 4ac$$

Because $a = -1$, $b = 0$ and $c = 1$ we get: D = 4

$$\text{area} = \frac{4\sqrt{4}}{6.1^2}$$
$$= \frac{8}{6}$$
$$= \frac{4}{3} \text{ unit area}$$

Now we calculate using analytic geometry of Figure 4 represents a single box unit area . To determine the extent of the area, note the box that appears in the Figure below .

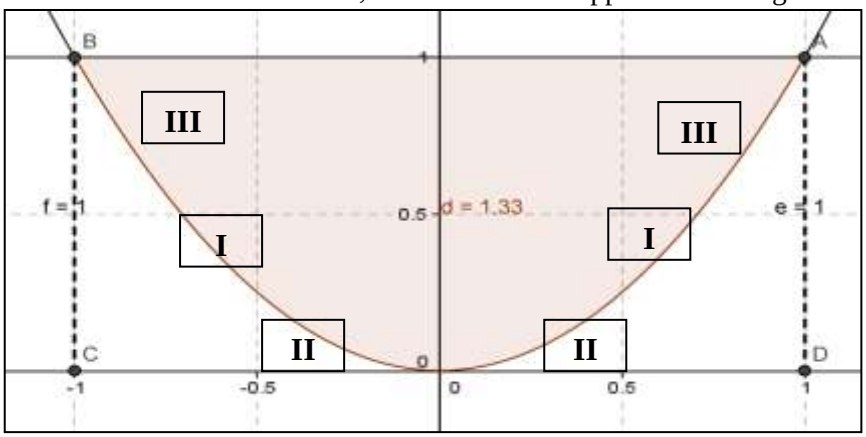


Figure 4 . Proof geometrically

Thus , geometrically obtained extensive analysis coincides with the part I part II so that part I cover part II , part III approached then wake up with a broad flat trapezoid :

$$\text{Area} = \frac{2 \times (1 + 0{,}5) \times 1}{2}$$
$$= \frac{(1 + 0{,}5) \times 1}{1}$$
$$= 1{,}5$$

Because , one unit of area equal to 4 boxes ; the extensive shaded areas

$$\text{area} = 1 \text{ unit area} + \frac{\frac{3}{2}}{4} \text{ unit area}$$
$$= 1 \text{ unit area} + \frac{3}{8} \text{ unit area}$$
$$= 1{,}375 \text{ unit area} \approx 1{,}33 \text{ unit area}$$

Researchers find 0,042 difference to the results sought by Integral formula , This is due to the difference in the equation I and wide awake wide awake II or also called tolerance level .

The above formula can be used to determine the extent of shading below the x-axis . We take the values a = 1 and k = -1 by using GeoGebra with Integral formula obtained breadth is 4/3 unit area or unit area of 1.33 Flat in Figure below :

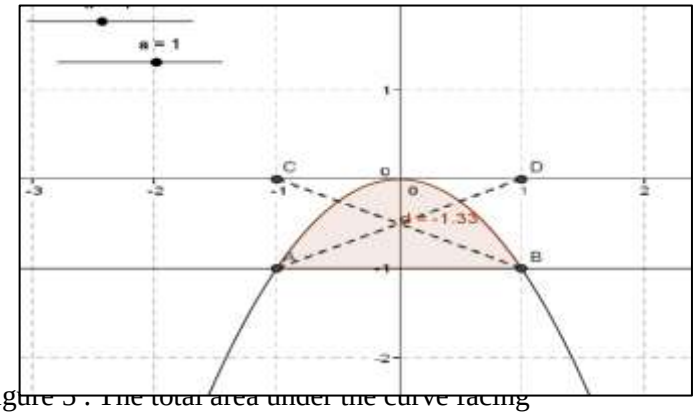


Figure 5 . The total area under the curve facing

When considered in geometry by counting the number of boxes 1 unit area , the results obtained following Figure :

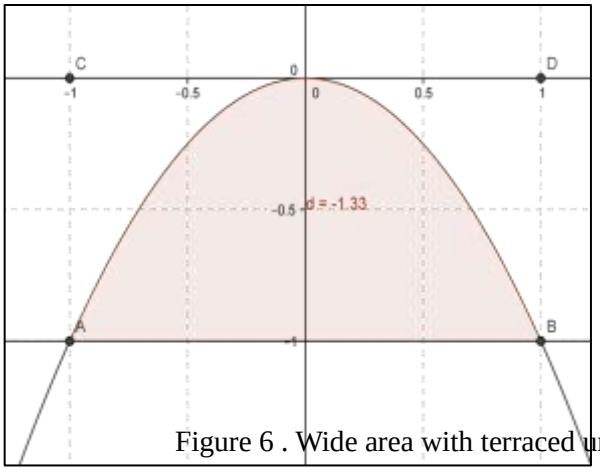


Figure 6 . Wide area with terraced unit

B. DESCRIPTION OF BROAD ANALYSIS OF FORMULA

To determine proof of the above formula . We can conclude that measuring the area bounded quadratic curve with the x axis is equal to calculating

$$\int_{x_1}^{x_2} f(x)dx$$

Just look at the upper limit and lower limit of the integral . They are the roots of the quadratic equation . Because it is that we are looking for is the area bounded by a quadratic curve and the x-axis . Of course, the lower limit is the smallest root , and a root of the upper limit is large .

Now we suppose that a uadratic equation

$$f(x) = ax^2 + bx + c$$

$$\int_{x_1}^{x_2} f(x)\,dx = \int_{x_1}^{x_2} ax^2 + bx + c\,dx$$
$$\frac{a}{3}(x_2^3 - x_1^3) + \frac{b}{2}(x_2^2 - x_1^2) + c(x_2 - x_1)$$
$$\frac{a}{3}(x_2 - x_1)(x_2^2 + x_1^2 + x_1x_2) + \frac{b}{2}(x_2 - x_1)(x_1 + x_2) + c(x_2 - x_1)$$
$$(x_2 - x_1)(\frac{a}{3}(x_2^2 + x_1^2 + x_1x_2) + \frac{b}{2}(x_1 + x_2) + c)$$

Remember!

$$x_1 + x_2 = \frac{-b}{a}; \qquad x_1x_2 = \frac{c}{a}; \qquad x_2 - x_1 = \frac{\sqrt{D}}{a}$$
$$x_1^2 + x_2^2 = (x_1 + x_2)^2 - 2x_1x_2 = \frac{b^2}{a^2} - \frac{2c}{a} = \frac{b^2 - 2ac}{a^2}$$

So we get

$$\int_{x_1}^{x_2} f(x)\,dx$$
$$= \frac{\sqrt{D}}{a}(\frac{2b^2 - 2ac - 3b^2 + 6ac}{6a})$$
$$= \frac{\sqrt{D}}{a}(\frac{-D}{6a})$$
$$= \frac{-D\sqrt{D}}{6a^2}$$ ……. proven

In order to get better understand about the area in determining the wake formed by the lines and curves using the peak and the axis of symmetry of a quadratic function , note .

We define that :

Width = distance of the second point on the x-axis

Height = the distance between the peaks to the line y = ka

By taking the value of a = 1 and k = 1 , width = 1 - (-1) = 2 and high = 1

So Area = 2/3 × 2 × 1

= 4/3 unit area

Now the formula above our analysis :

Area = 2/3 × Width × Height

As in the previous explanation , we suppose that a quadratic equation is $ax^2 + bx + c$ Thus ,

Width = $x_2 - x_1 = \frac{\sqrt{D}}{a}$

Height= $Peak\ formula = \frac{D}{4a}$

So Area $= \frac{2}{3} \times \frac{\sqrt{D}}{a} \times \frac{D}{4a}$

$= \frac{D\sqrt{D}}{6a^2}$

Shape of the area formed by the line y = Ka2 and the curve y = x axis is limited kx2 lines x = a and x = -a restricted area equivalent to the area formed by the curve y = x axis kx^2 limited .

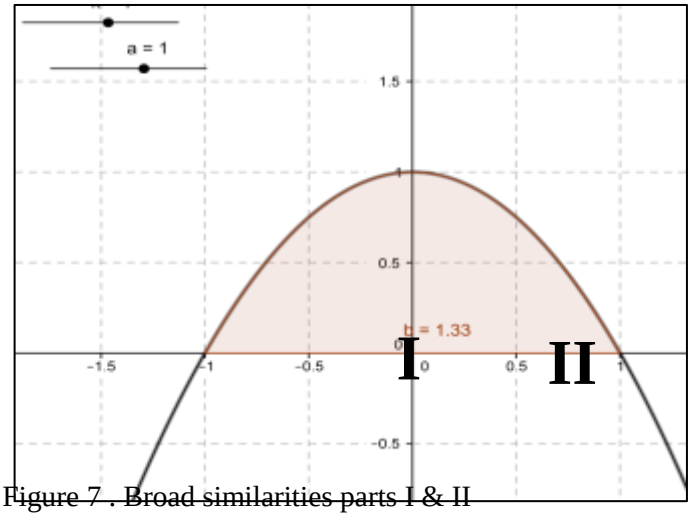


Figure 7 . Broad similarities parts I & II

discussion

Since the total area of broad part I and part II is the same

Then Area = 4/3

= 2/3 × 2 × 1

= 2/3 × Width × Height

This applies also to half shaded above , we note the following Figure :

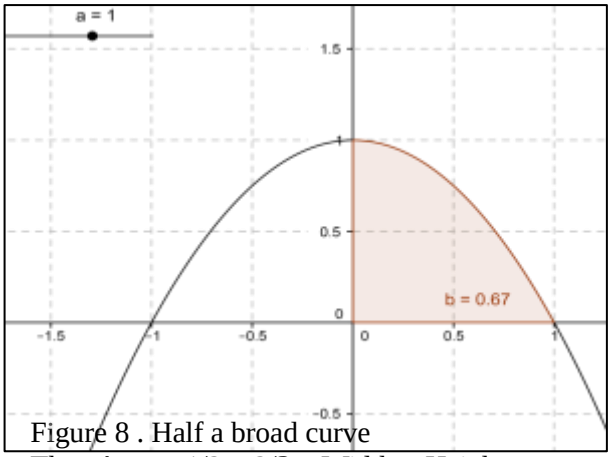


Figure 8 . Half a broad curve

Then Area = 1/2 × 2/3 × Width × Height

= 1/3 × Width × Height

= 2/3 × Half Width × Height

As for outside the area but still within the shaded rectangle :

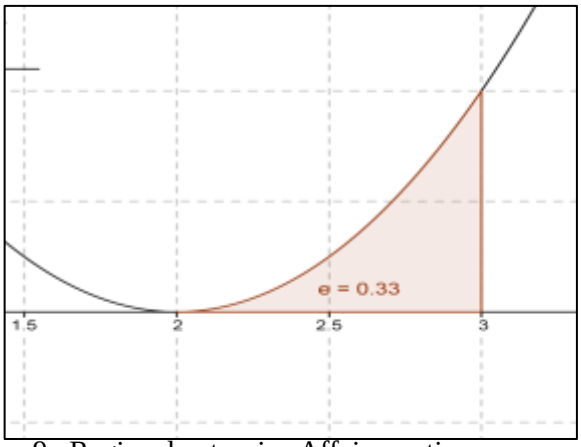


Figure 9 . Regional extensive Affairs section curve

Then Area = 1-2/3 × Width × Height Half
= 1/3 × Half Width × Height

C. DESCRIPTION OF ANALYSIS USING GEOGEBRA

As we all know that GeoGebra can be used freely and without paying any license. This software can be downloaded easily through interinet . However , as the record GeoGebra need other software to run correctly , namely Java . Java software can also be downloaded for free from the internet . To get the Java software , we can go to the site java.com . Select the Download section and then select All Java Download.

This section will discuss how the features of GeoGebra can be further explored through a tool not only visually but also with the command (command) as well as how to work with equations , and trigonometric functions and calculate the area formed by lines and curves .

In GeoGebra below , some of the tools available in the form of buttons / icons we can also utilize the input bar to the use of more complex and detailed .

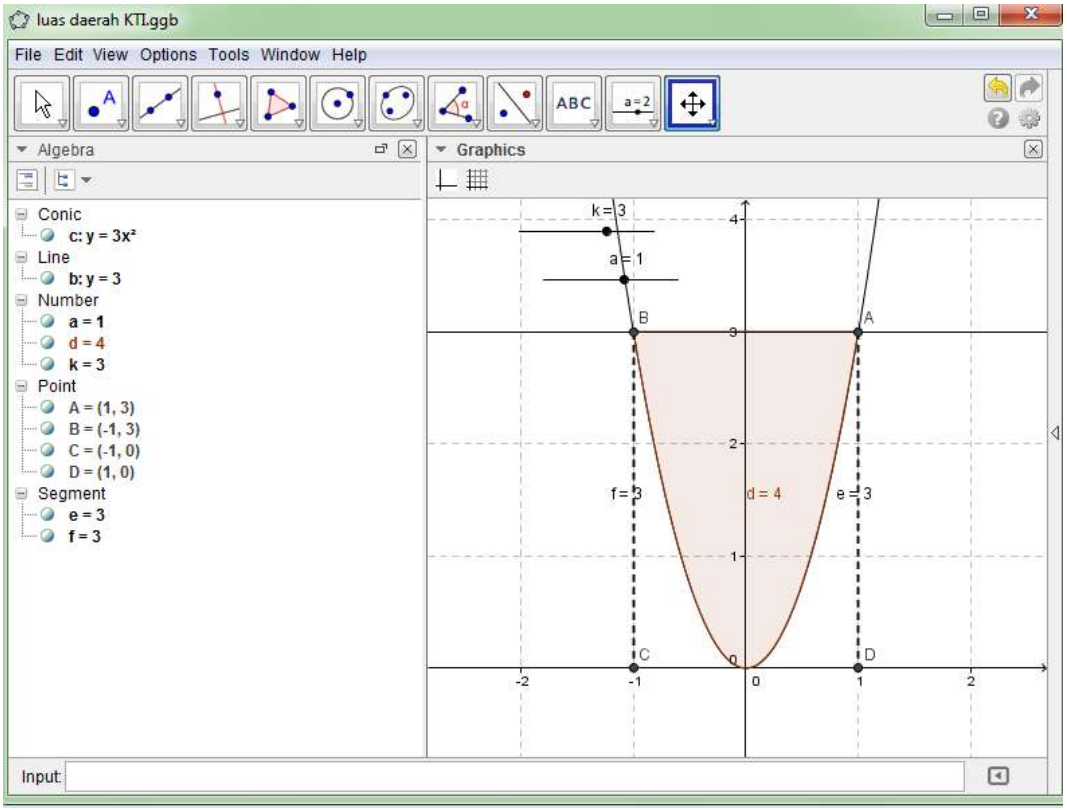


Figure 10 . media GeoGebra

The author provides two sliders are made ??: (1) variable k to determine the dynamic motion graphics parabolic curve with k value is -10 = k = 10 . And (2) a variable to determine the height of the curve on the X axis with a value is -10 = a = 10 .

D. DESCRIPTION OF SERIES ANALYSIS " H154M "

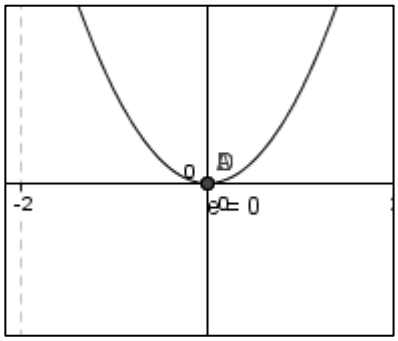
The first phase of the research activities think talk write strategy is think , think is the stage where authors read and understand the problems that exist in the various sources of books on the area under the curve or in between the lines and curves . In this stage the individual authors think of possible answers (exit strategy) , make a small note about the ideas contained in the matter , and things that are unique to the process and ultimately value . At this stage, the authors developed a mathematical communication such as ability to understand , mengiterpretasikan , and evaluate mathematical ideas , read with comprehension or written presentations of mathematics , filed allegations (conjegtures) , and find patterns or mathematical nature of the symptoms to make generalizations .

The second stage is the talk (talk or discussion) provides the opportunity for the author to talk about the investigation in the first stage . At this stage the authors reflect , construct , and test (negotiation , sharing) ideas in group discussion activities MGMPs . The ideas that writers get discussed with friends and the author of the national level .

The third stage is a write , the authors jot down ideas that is the answer to the questions contained in the various books they obtain in the first and second stages .

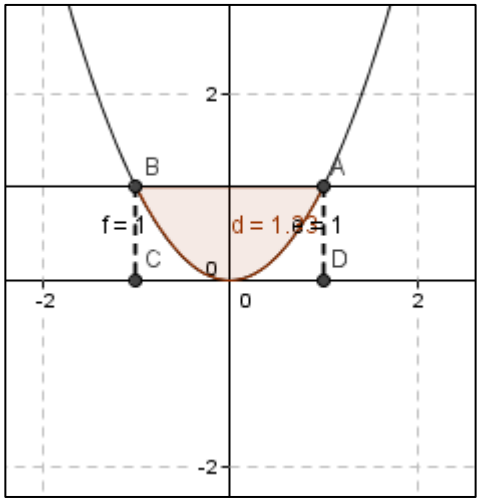
The area formed by the curve $y = Ka$ and $y = kx^2$, the x-axis , the line $x = -\sqrt{a}$ and $x = \sqrt{a}$ line forming a series of numbers for $k = 1$ and $a \in$ Original number using the GeoGebra application obtained as follows :

For a = 0 , then the area is formed by the curve y = 0 and y = x2 , the x-axis , the line x = 0



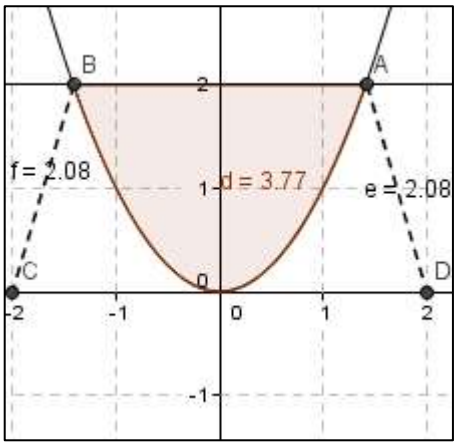
The total area is 0 unit area

For a = 1 , then the area is formed by the curve y = 1 and y = x2 , the x-axis , the line x = -1 and the line x = 1



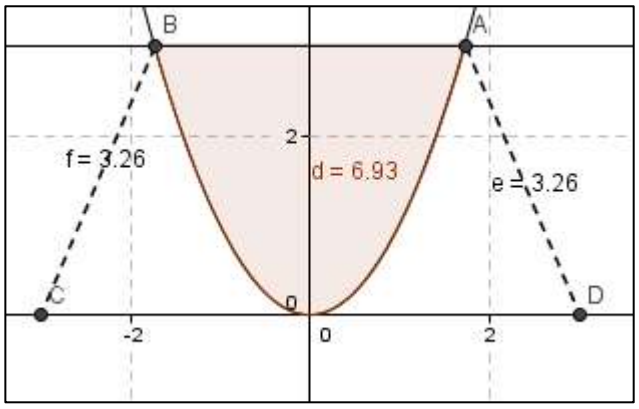
Regional extensive unit area is 1.33

For a = 2 , then the area is formed by the curve y = 2 and y = x2 , the x-axis , the line x = -√ 2 and the line x = √ 2



The total area is 3.77 unit area

For a = 3 , then the area is formed by the curve y = 3 and y = x2 , the x-axis , the line x = - √ 3 and the line x = √ 3



The total area is 6.93 unit area

From the above discussion , the series obtained as follows :

0 +1.33 +3.77 +6.93 + … + Un = Sn

In the area formula (analytical) that have been described in Chapter II is Area = $\frac{D\sqrt{D}}{6a^2}$, with D = b^2 - 4ac then the area formed by the curve y = ka and y = kx^2 , axis x , the line x = -√a and x = √a form of a series of numbers for k = 1 and a ∈ Natural number is obtained as follows :

1. For a = 0 , then the area is formed by the curve y = 0 and y = x^2 , the x-axis , the line x = 0 so a = 1 , b = 0 and c = 0 is obtained D = 0 , Area == $\frac{0\sqrt{0}}{6.1^2}$; So the total area is 0 unit area
2. For a = 1 , then the area is formed by the curve y = 1 and y = x2 , the x-axis , the line x = -1 and the line x = 1 so that a = 1 , b = 0 and c = -1 obtained D = 4 , Area = $\frac{4\sqrt{4}}{6.1^2} = \frac{8}{6} = \frac{4}{3}$; So is the Regional Area 4/3 unit area
3. For a = 2 , then the area is formed by the curve y = 2 and y = x^2 , the x-axis , the line x = -√2 and the line x = √2 so a = 1 , b = 0 and c = -2 obtained D = 8 , Area = = $\frac{8\sqrt{8}}{6.1^2} = \frac{16\sqrt{2}}{6} = \frac{8\sqrt{2}}{3}$; So the total area is $\frac{8\sqrt{2}}{3}$unit area
4. For a = 3 , then the area is formed by the curve y = 3 and y = x2 , the x-axis , the line x = -√3 and the line x = √3 so a = 1 , b = 0 and c = -3 obtained D = 12 , Area = $\frac{12\sqrt{12}}{6.1^2} = \frac{24\sqrt{3}}{6} = 4\sqrt{3}$; So the total area is $4\sqrt{3}$ unit area

In the area formula (geometric) already described , we define that width = distance of the second point on the x-axis and Height = distance between the peaks to the line y = ka . By taking the value of a = 1 and k = 1 , width = 1 - (-1) = 2 and high = 1

So Area = 2/3 × 2 × 1

= 4/3 unit area

We get a series formula as below:

$$\sum_{i=0}^{n} \frac{4n\sqrt{n}}{3} = 0 + \frac{4}{3} + \frac{8\sqrt{2}}{3} + 4\sqrt{3} + \cdots + \frac{4n\sqrt{n}}{3}$$

The author calls the series " H154M "

$$\frac{4}{3}+\frac{8\sqrt{2}}{3}+4\sqrt{3}+\cdots+\frac{4n\sqrt{n}}{3}=S_n$$

$$\begin{cases}\frac{4}{3}\left[(n-1)^{3/2}+n^{3/2}\right]; \text{ for n= 1, 2}\\ \frac{4}{3}\left[(n-1)^{3/2}+n^{3/2}\right]+S_{n-2}; \text{ for n} \geq 3\end{cases}$$

By using mathematical induction :

Proof: lets suppose for n = 1 ➔ $\frac{4}{3}=\frac{4}{3}\left[(1-1)^{3/2}+1^{3/2}\right]=\frac{4}{3}$ ….. Proven

For n =2 ➔ $\frac{4}{3}+\frac{8\sqrt{2}}{3}=\frac{4}{3}\left[(2-1)^{3/2}+2^{3/2}\right]=\frac{4}{3}+\frac{8\sqrt{2}}{3}$ …… proven

Let suppose is proven for n = k ➔

$$\frac{4}{3}+\frac{8\sqrt{2}}{3}+4\sqrt{3}+\cdots+\frac{4k\sqrt{k}}{3}=S_k$$

$$\begin{cases}\frac{4}{3}\left[(k-1)^{3/2}+k^{3/2}\right]; \text{ for k= 1, 2}\\ \frac{4}{3}\left[(k-1)^{3/2}+k^{3/2}\right]+S_{k-2}; \text{ for k} \geq 3\end{cases}$$

We will proof for n = k + 1

$$\frac{4}{3}+\frac{8\sqrt{2}}{3}+4\sqrt{3}+\cdots+\frac{4k\sqrt{k}}{3}+\frac{4(k+1)\sqrt{(k+1)}}{3}=\frac{4}{3}\left[(k-1)^{\frac{3}{2}}+k^{\frac{3}{2}}\right]+\frac{4(k+1)\sqrt{(k+1)}}{3}$$

$$=\frac{4}{3}\left[(k-1)^{\frac{3}{2}}+k^{\frac{3}{2}}\right]+\frac{4}{3}(k+1)^{\frac{3}{2}}$$

$$=\frac{4}{3}\left[(k-1)^{\frac{3}{2}}+k^{\frac{3}{2}}+(k+1)^{\frac{3}{2}}\right]$$

$$=\frac{4}{3}\left[(k+1-2)^{\frac{3}{2}}+(k+1-1)^{\frac{3}{2}}+(k+1)^{\frac{3}{2}}\right]$$

$$=\frac{4}{3}\left[(k+1-1)^{\frac{3}{2}}+(k+1)^{\frac{3}{2}}\right]+S_{k+1-2}$$ …… proven

CHAPTER V CONCLUSION

A. CONCLUSION

Development of Figurean be summarized as follows :

1 . General student response to the Think Talk Write -assisted strategy worksheet is high . In addition , based on a questionnaire completed by showing that the learning strategy aided Think Talk Write worksheet favored and showed a positive attitude towards learning strategy Think Talk Write -aided worksheet. context analys who set by the National Education Standards Agency .

2 . There is an increase math learning outcomes .

B. ADVICE

1. Students should be trained in cooperative learning skills to the learning process more effective , because talk is needed at this stage of cooperative skills .
2. In order for the stages in this strategy get optimal results , the media needed to facilitate student learning in constructing his own mind

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