

# Use of Software Authograph in Integral

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**Abstract:** Computer technology in the world of education is very important because the learning process will be more effective and interesting for students. Various kinds of computer technology software applications used in the learning process, one of them is Authograph software is computer software used by educators in learning mathematics who study two dimensions, three dimensions, calculus, algebra, geometry, and others where the design is flexible, repetitive and conclude. Learning using software Authograph can make students interested in the learning process and can improve learning effectiveness. The existence of software Authograph will make it easier for students to receive advanced calculus courses or subjects, one of which is on integral material, where software authograph will be able to visualize integral material in advanced calculus subject. This research method uses research and development, the data collection of this research is observation, interviews, design, testing, and implementation.

**Keywords:** *software, authograph, integral materials*

## INTRODUCTION

Various kinds of computer technology software applications used in the learning process, one of them is Authograph software. Learning using software authograph can make students interested in the learning process and can improve learning effectiveness. Teaching by integrating authograph in schools might increase the effectiveness and the quality of teaching (Tarmizi, et al., 2008). The existence of software authograph will make it easier for students to receive accepted material or courses, one of which is advanced calculus courses, where the software authograph will be able to visualize material in advanced calculus courses. The use of authograph help teachers in making students attentive towards the interactive whiteboard (Tarmizi et al., 2008).

Authograph is another technology which is dynamic software for teaching calculus, algebra and coordinate geometry. It also enables users to change and animate graphs. Teaching by integrating Authograph in schools might increase the effectiveness and the quality of teaching. Authograph condition imposes high mental effort with low performance (Tarmizi et al, 2008). The difference in mathematical ability is assisted by authograph software (Risdianto et al, 2013). Computer technology in the world of education is very important because the learning process will be more effective and interesting for students. As technological developments accelerate in educational settings, integrating computer technology into academic learning aims (Wright, 2001). The acceptance of new technologies has long been an area of inquiry in the MIS literature (McCloskey, 2006). So that computer technology is always prioritized in various types of fields, especially in the field of education. Technological development is the most important thing for students (Wolpaw et al., 2000). Higher education and income levels positively influenced computer usage and ownership (Chakraborty & Bosman, 2005). Learning by using computers requires interest in computers and experience using computers.

Computers are a part of everyday experiences and families are realizing the indispensability of having access to them (Ortiz et al, 2011). The adoption of computers in teaching is a complex innovation in which many obstacles need to be overcome (Akbaba-Altun, 2006). Teachers to attract the attention of students, the teachers use computer technology. Teachers believe that the use of computer technology is a useful tool for teaching and learning (Kiridis et al, 2006). Teachers who are willing to spend time using computers are more likely to gain confidence in using computers (ChanLin, 2007). Teachers must be willing and able to use technology effectively in their teaching to realize the benefits that the technology can offer (Luan et al, 2005). The use of computer technology in the learning process is very supportive for success between lecturers and students. Lecturers play an important role in the success of student learning (Wahyuni & Kurniawan, 2018). For lecturers in the learning process using computer technology will be more effective in explaining, while for students in the learning process using computer technology will be more interesting and not boring when receiving learning. While access to educational technology tools has remarkably improved in most schools (Keengwe et al, 2008). The use of computer technology has become a demand in the world of education. Technology use allows many more students to be actively thinking about information (Tarmizi et al, 2008). High-quality learning has six principles, namely equality, curriculum, teaching, learning, assessment, and technology (NCTM., 2000). These principles are very good if implemented in teaching and learning activities, so that the achievement of learning objectives will be realized. But there is one principle that is very important in the learning process, namely technology. The structuring of technologies in use refers to the processes through which users manipulate and reshape their technologies to accomplish work (Majchrzak et al, 2000). Technology indeed has changed the way classrooms operate, integrating multimedia during learning (Butler, 2008).

## **SOFTWARE AUTHOGRAPH**

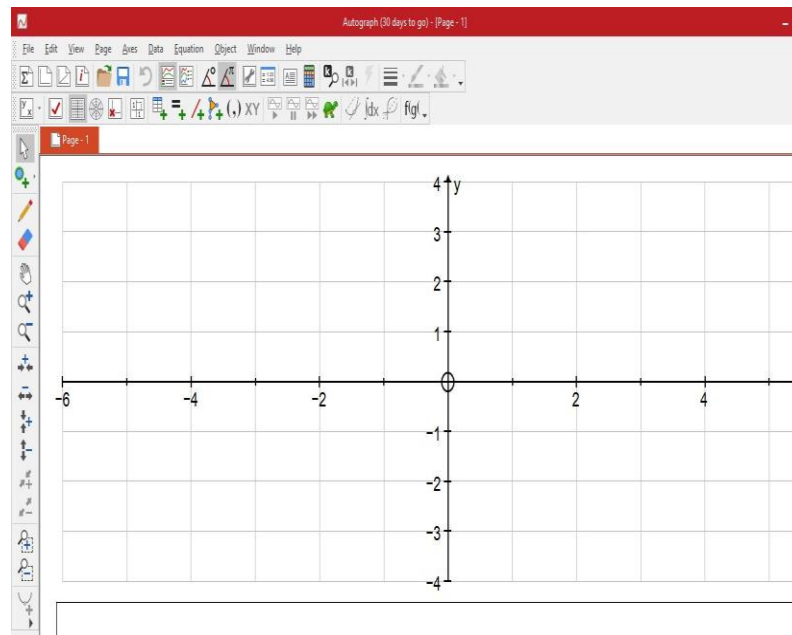
The use of computer technology media will help lecturers in the learning process, students will be more active and more interested in the courses taught by the lecturer. Technology is an important tool for teaching and learning mathematics (Anim et al, 2018). The mathematical communication process may also provide students with opportunities to share ideas (Chung et al, 2016). With the existence of technology and communication between students, this will have a positive effect on the students themselves.

Techniques in simulation programs using software include direct modeling techniques and own programming techniques (Sucita & Pendidikan, 2009). In the case, we use our programming technique, namely by using the Authograph as one of the active role of students in the learning process (Saragih & Afriati, 2012). The use of authograph as a medium of learning with procedural knowledge and declarative knowledge (Manurung, 2016). The use of software authograph is very helpful in the process of teaching and learning activities, students will be more active in accepting learning, the learning atmosphere will be fun so that the lecturer will explain the material will be more quickly understood and understood by students.

Authograph is a dynamic software for teaching mathematics such as calculus, algebra and coordinate geometry (Karnasih & Sinaga, 2014). Authograph is an extremely useful educational tool for both mathematics teachers (Tarmizi et al, 2008). Software authograph is media that studies two dimensions, three dimensions, statistics, geometry, calculus, algebra, and others (Karnasih, 2008). An authograph is software whose design includes flexibility, repetitive and

draws conclusions (Risdianto et al, 2013). From some of the opinions above, it can be concluded by researchers that the authograph is computer software used by educators in learning mathematics who study two dimensions, three dimensions, calculus, algebra, geometry and others where the design is flexible, repetitive and conclude.

The advantages of using authograph in learning include; influencing work processes by increasing production, overcoming student difficulties in image construction, increasing variety and attractiveness of activities in the classroom, students can develop their answers with students' ideas, and reinforce concepts.



**Figure 1.** Initial Display of Authograph

This software is designed to help lecturers and students visualize mathematics using three models including: dimension for opportunity and statistic; dimensions for charting, coordinates, transformation and bivariate data; dimensions for charting, coordinates, transformation in three-dimensional space. There are two operating levels namely "Standard" and "Advanced". The practice of junior high and high school level of "Standard", but for practice questions at the level of Higher Education using the "Advanced" level because the program is more complete.

## RESULTS AND DISCUSSION

### 1. The area between two curves

If  $f$  and  $g$  are continuous functions with  $f(x) \geq g(x)$  in the interval  $[a, b]$ , then the area between the curves  $y = f(x)$  and  $y = g(x)$  from  $a$  to  $b$  is the  $[f(x)-g(x)]$  integral from  $a$  to  $b$ .

The command to draw a graph and find the area that is limited by  $y = 4 - x^2$  and the  $x$  axis. The resulting graph is as follows.

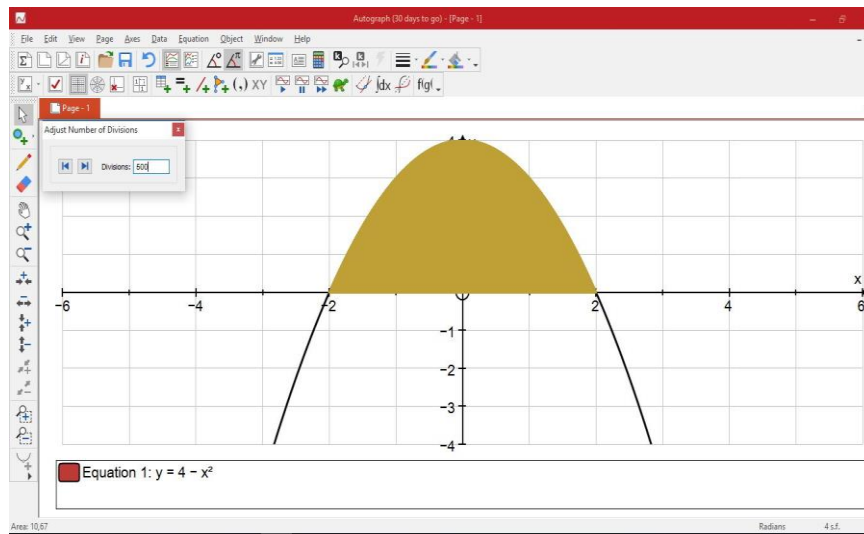


Figure 2. Graph Results

Based on the picture above figure 2, the graph of the equation  $y = 4 - x^2$  and the x axis has an area of 10.67 units.

The command to draw a graph and find the area that is limited by  $y = x^2 - 2x - 3$ ,  $x = 1$  and  $x = 4$ . The resulting graph is as follows.

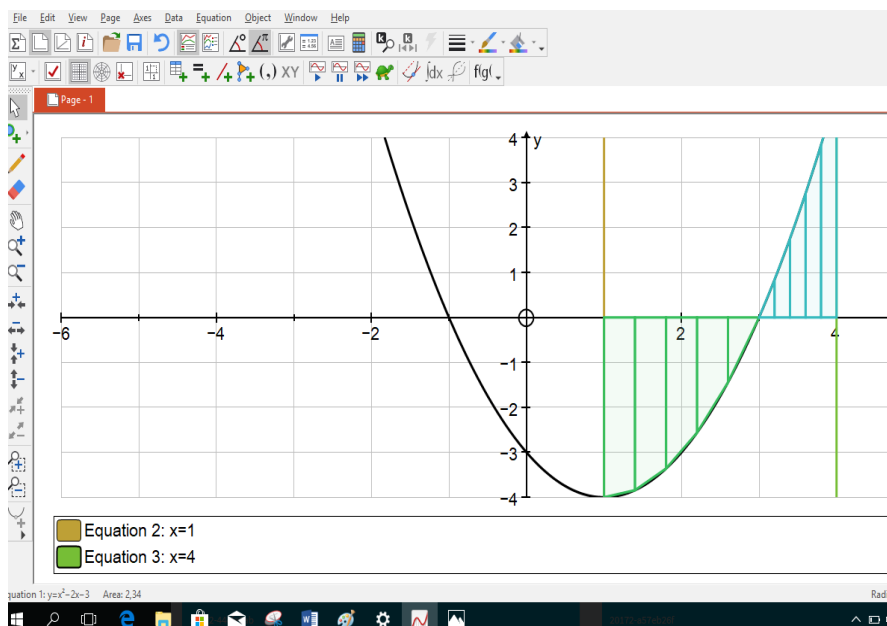


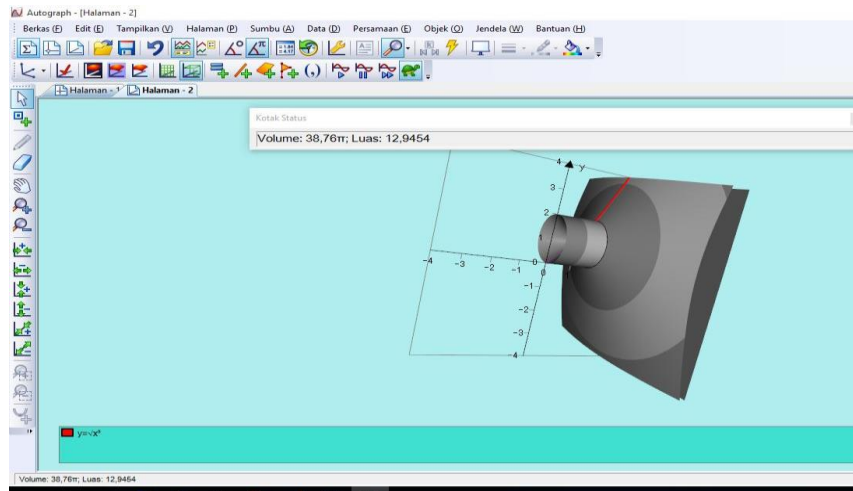
Figure 3. Graph Results

Based on the picture above figure 3, the graph of the equation by  $y = x^2 - 2x - 3$ ,  $x = 1$  and  $x = 4$  has an area of 2.34 units.

2. The surface area of the rotating object and the volume of the rotating object

If a flat plane, which is located entirely on one side of a fixed line in its plane is rotated around the line, that area will form a rotating object.

The command to find the surface area of a rotating object and the volume of a rotating object is limited by the curve  $y = \sqrt{x^3}$ . The resulting image is as follows.



**Figure 4.** Graph Results

Based on the picture above figure 4, it can be obtained the surface area of the rotary object = 12.9454 and the volume of the rotary object =  $38.76\pi$

## CONCLUSIONS

Authograph software is computer software used by educators in learning mathematics who study two dimensions, three dimensions, calculus, algebra, geometry and others where the design is flexible, repetitive and draw conclusions. Integral material that uses software authograph includes material in the area of rotating objects and volumes of rotating objects, where the material requires imagination or visualization in terms of drawing graphics. The use of software authograph is very helpful in the process of teaching and learning activities lecturers will be more quickly understood and understood by students.

The use of Authograph software is very potential in learning mathematics, especially integral material. In the era of technology as technology-based mathematics learning with the use of authograph, researchers have socialized one computer software to increase student interest in learning mathematics.

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