

GEOGEBRA AS TECHNO PEDAGOGICAL TOOL IN MATHEMATICS

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ABSTRACT

We want to explore the causes of learning difficulties in Mathematics especially faced by students. Much number of different data Texts has also been published from potential participants among all the subjects available. Mathematics is the subject which is carrying utmost attention. Everything is possible in the world if we are strong in mathematics our ancient scholars were very strong in mathematics. We are doing many research works pertaining to mathematics and succeeded in our attempts. Mathematics is an interesting subject because of symbols, formulas, signs, derivation and has become an important part of in the world of science and Technology. Despite of development in many angles regarding Teaching and Learning Mathematics even now students are feeling mathematics as a different one. This can be over ruled by practical demonstration and thereby making the students to understand about mathematics simultaneously driving the fear complex existing. Students do not conceptually understand mathematics but only as a subject to help them in seeking profession. It is in the hands of teacher to make the mathematics teaching colourful as possible as they can. With all explanation above deductive reasoning are making the students to understand the correlation between life and mathematics when we give visual demonstration regarding geogebra students are becoming active learners from passive learners.

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Introduction

Among all the software available at present in Mathematics .Geogebra is acting as a powerful Teaching Tool which is leading a main role.Geogebra is open source software and there by anybody can easily access in view of Teaching and Learning Mathematics.Geogebra is developing the best interaction and helping to bring out the potentiality of the Teacher as well as students individually while learning Mathematics affecting factors are many.

1. Methodology of Teachers are not well versed with clarity and specification and there by becomes difficult while reaching student
2. Motivation is lacking to the core which is the main reason for students disinterest towards mathematics
3. Teachers are failing in proper interaction with students because they are unable to

point out the particular difficulty of an individual student.

4. Education and psychology are best parameters Teachers are failing in counselling so that students encouragement degree is lacking.

5. Teachers are unable to co-relate the real importance of Mathematics without routine life.

6. Students related factors are they are very much scared in learning Mathematics due to want of so many factors.

7. Lacking or prior knowledge, about student's participation in class room activity

8. Students are not having sufficient memory and attention tool

9. Parents failure in arranging their support to their children in order to improve their standard in mathematics

10. Insupport of student's congenial home environment is also not there

11. Economical setback of parents is also valid reason

12. The level of literacy is inadequate and hence many parents are not able to find their real difficulty.

13. Major factor required is students labour

14. Infrastructure without laboratory in many schools is also a major reason

15. Periodical assessment is not being done in all schools only then student's interest towards mathematics can be judged and appropriate steps can be taken. This paper is going to analyse about geogebra how to give colourful and active learning tool to student.

Free Math Tool Geogebra

Open Source Software is only Geogebra. Everyone can easily download from website of www.geogebra.org. Most innovative Technological tool is geogebra which is increasing the interest of Teaching and learning in mathematics. Markus hochenwater and prenier developed software in the year 2001. Comfortable software and we can solve the problem in our own method. Major

chapter in mathematics like geometry algebra statics calculus application where Geogebra is helping the subject. The problem of imagination construction and understanding is being solved by Geogebra only. In

Mathematics students who are voluntarily doing their home assignment are getting confidence because of Geogebra. Without panic all problems can be solved by students. Multiple Platforms with application like window OS Mac OS Linux OS are available where we can work with Geogebra. Modern Communication devices like Android OS and Apple OS we can work with Geogebra.

Geogebra in Techno-pedagogy

Geogebra eradicates Learner's Panic and acts as an easy user in conceptual learning and understanding improvement. Highlight of Geogebra is available in the form of objects for representation and completion of Projects with all possibility of publishing along with guidance of documentation with Technical support. Specific appreciation of geogebra is the availability in multilingual option.

Geogebra is very much appreciated because of the possibility of dual representation like graphic as well as algebraic. Modified software flexibility along with geometrical construction is also a valuable point. Availability of innumerable tools which are ready to serve polygon line, segments, circle, angle, slope, text, Zoom in, Zoom out in more graphic view, slide option for the dragging the object and rotate 3 dimensional view. We have conveniences like menu bar where Latex, number pad are included. Important key point to be emphasized is easier for us to save formula and our sum workouts in www.Geogebra.orgin the resource option. We can continue some balance left out and finish effectively. Geometry spreadsheet

algebra can be modified according to our requirements where interconnection, appropriate formation, are the points to be mentioned. Specifically many changes in all parameters can be shown now on a graph. Geogebra has got enormous calculation value.

The value of appreciable interaction and accurate responsibility are being understood both by students and Teachers. Individual innovative ability is also increased. The capacity of understanding and powerful Teaching especially in mathematics with students as well as Teachers are considerably improved to a greater extend. Present generation of students as well as young teachers have got all possibilities of proving their creative and construction ability individually with the help of Geogebra in learning and Teaching Mathematics.

Classroom Activities

A Sample for the Geogebra Constructed Activities:

1. Construction of conic section to shown on the parabola, circle, Hyperbola, Ellipse

Summarize the properties of Conic Section with slider before you start the construction. Hint: If you do not know the construction steps necessary for the Conic Section, you refer to the 1. Geogebra Handbook for senior secondary Mathematics Teachers by Regional Institute of Mysuru, Tamil Nadu.

Use the buttons of Navigation bar in order to replay the construction process.

- Open new Geogebra file either Geogebra 5.04 or Geogebra classic 6
- Go to Input bar give the click option Hide (if you want) algebra window, and graphical view.

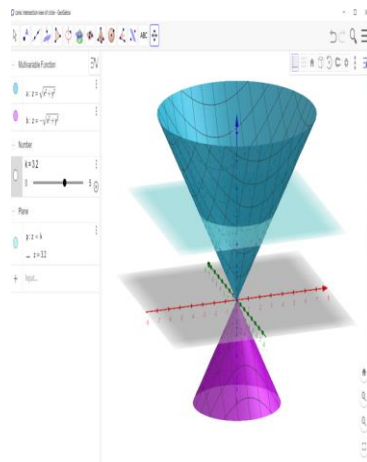
Select Text option, give the title of the problem Circle, Parabola, Ellipse, Hyperbola view from Conic Section fix it where u want on the screen.

Construction Process

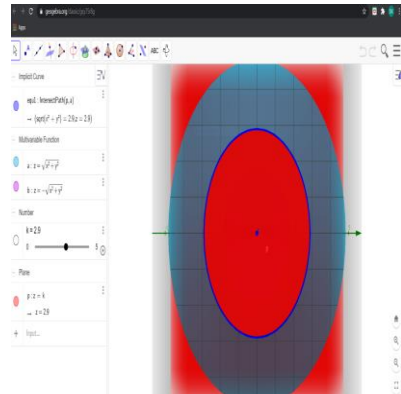
1. Open Algebraic View and 3D graphics view hide in graphics view.
2. Given Input on a X^2+Y^2 get a conic on XYZ plane and next give Input on $Z= -X^2+Y^2$ get a below Reverse cone on XYZ Plane.
3. Preparing to make slider, given next input any letter like $K=1$ slider appeared and change the slider value $k=0$ to 5.
4. Next Input given P: $Z=K$ the slider will be activated and appeared additional new plane on the XYZ plane.
5. Rotate conic Section in 3D graphic view according to our convenience and if we drag the slider left to right the additional new plane will give the circle view in inside the upper cone.
6. The Plane will move up and down on the upper cone. Colour of the plane is being changed to red colour. We get the clear view with red colour background.
7. Input of Intersection path (a, p) we get circle with path in our clear vision.
8. We have shown the plan horizontally intersect with conic section Now drag the slider we get the view of circle increase and decrease

II. Circle View

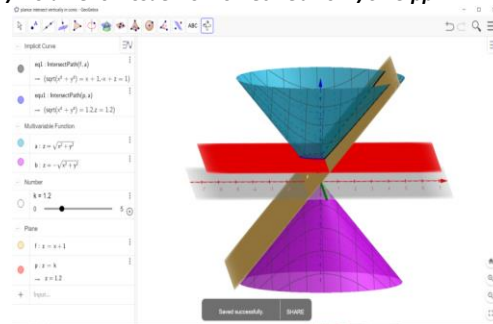
1. Given Input f: $Z=X+1$ new plane is arising just change the colour of the plane for clear view.
2. Rotate the 3D graphics view. We get plane intersect the conic in slanting position. We get the parabola view
3. Give Input eqz: intersect the path (f, a) We get parabola view with path.



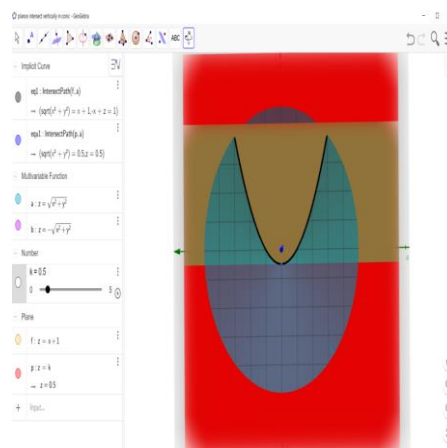
1.1 Plane intersect Horizontally with conic section



1.2 Circle view in the conic section



1.4 plane intersect slantly in the Conic Section



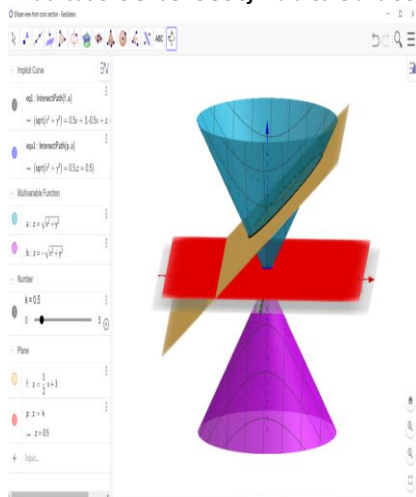
1.4 parabola view from Conic Section

II Parabola View

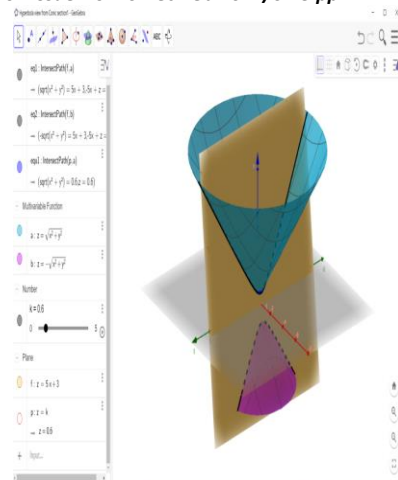
1. Given Input f: $Z=X+1$ new plane is arising just change the colour of the plane for clear view.
2. Rotate the 3D graphics view. We get plane intersect the conic in slanting position. We get the parabola view.
3. Give Input eqz: intersect path (f, a) we get parabola view with path.

III.Ellipse View

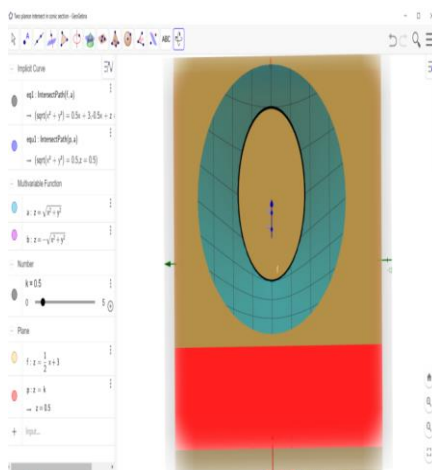
1. Given Input f: $Z=1/2X+3$ Now rotate the 3D graphic view get the ellipse view.
2. Plane intersection of conic section in slanting position slightly uplifted, we get ellipse view



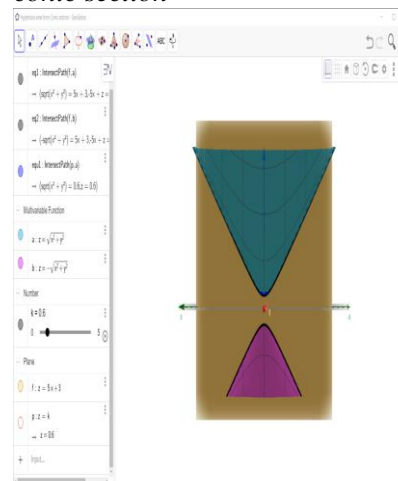
1.4. Plane intersect conic section slantly uplifted



1.5 Plane intersect vertically in the conic section



1.4. Ellipse view from conic section



1.6 Hyperbola view from conic section

IV. Hyperbola View

Given Input C: $Z=5X+3$ we will get the Hyperbola view. Plane intersects vertically in conic section.

Given Input of Intersect path(c, b) now look the hyperbola view with path very clearly

Construction Process II

Equation of the chord of contact tangents from a point to the circle.

The General Equation of the Circle is $X^2+Y^2+2gx+2fy+C=0$

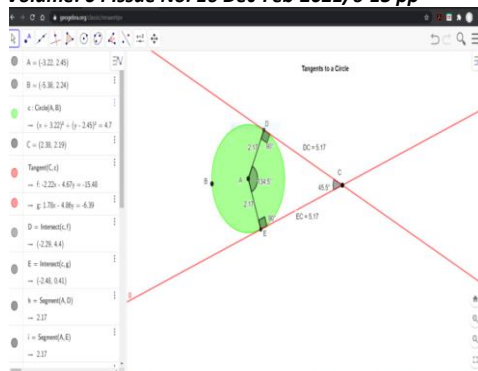
Let us presume p (X_1Y_1) be a point outside the circle. Let the Tangents from p (X_1Y_1) touch the Circle Q (X_2Y_2) and R(X_3, Y_3).

1. A Circle with centre let us construct a circle from the centre A through the point B.

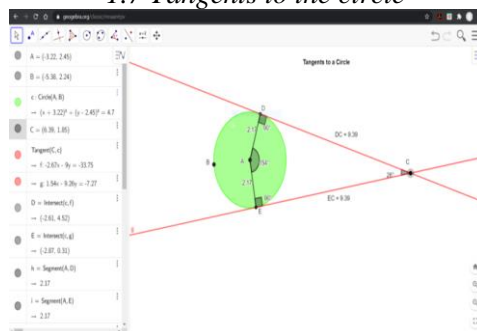
2. Let us construct C as the point outside the circle. We need to construct two tangents. Click C on the point and circle. We get two tangents. In Order to find the angle we need 1st intersection between circle and Tangent and 2nd intersection between circle and Tangent.

3. Draw the two line segment Give Input segment (A, D) segment forming on the screen A to D. segment (A, E) segment forming on the screen A to E. We get Quadrilateral ADCE Let us measure some angle and hence we go to find $\angle ADE$ $\angle DCE$ $\angle EAD$ $\angle DCE$

4. We get $\angle ADC = \angle AEC = 90^\circ$ if we select C and move around the angle is not changing. In forms of explanation I select which move upward 90° is not changing. The opposite angle is same and finds the distance C & D by using the distance measure tool and likewise find the distance CE. The same length is maintaining we can demonstrate this to our students in practical classes. During our demo we can show the student's tangent line never crosses the circle. It just touches the circle. Point of tangents perpendicular to the radius. So A chord and tangent form angle it shows 90° the length of tangent also shows CD, CE as same.



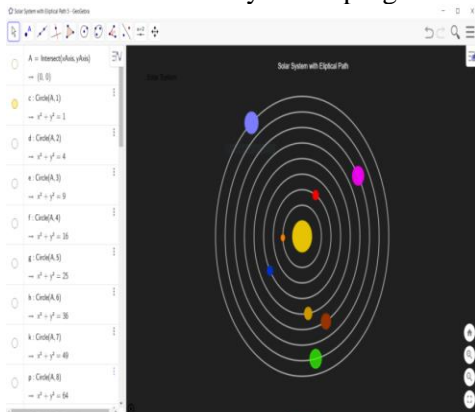
1.7 Tangents to the circle



1.8.Tangents perpendicular to the radius Geogebra in Science Teaching

Geogebra is partaking not only in Mathematics but also influenc higher subjects also like computer science, physics chemistry, Geography. In Science we can construct the programme of solar system, pendulum oscillation, clock rotating, and motion of the inclined plane in lower secondary level. In computer science labyrinth sketch vertices connected in shortest path, CAS, etc., construct the programme according to our requirements. Teachers can very well give assignments to students. They will explore different Assigned task and create the interest in pupil. Teachers and students can construct their own imagination because of malleable tools available like hammer. Develop the Applets which is shows the augmented

reality of the programme



1.8.3 Dimensional view of Solar system.

Conclusion

Many number of barriers we have seen in learning Mathematics and also teaching especially. All these barriers are diluting the learning and Teaching interest towards Mathematics. The easiest way to increase the interest is nothing but inculcates Geogebra software in learning process and makes the student to understand importance of the geogebra. Geogebra helps students to understand conceptual learning and simultaneously teachers in teaching and make both very comfortable. Geogebra is one among the most economical software helping student through teachers in an easy way while understanding Mathematics. Colourful and innovative learning process in the world of Mathematics has become an important factor because of Geogebra. Group gathering as well as interaction can now be appeared in the resource option of geogebra. Mathematics can be taught very confidently by Teachers and learned by students without any stress and strain which increasing the active learning ability as well as Teaching . Geogebra and micro worlds unitedly created the best class room atmosphere and make the students as the main part in the process of learning. Technological Education entry into lesson is

acting as helping tool which improves the achievement interest towards Geogebra and their by made us to claim Geogebra as techno pedagogical tool. Teachers and students will gain skills about Geogebra in schools and colleges and will initiate to allocate exclusive mathematics lab like science experimental lab along with Mathematical Research projects in India as per the student's cognitive level and interest. It will improve the ability of exploring the problem and various methods of solving the same.

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