Microsoft Mathematics as a Teaching and Learning Tool for Mathematics

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Abstract: This article depicts how the utilization of Microsoft Mathematics (MM) programming has encouraged for educators to build up their capacities in two viewpoints: 1) solving tough problem 2) developing students focused instructing course of actions. The specified models explain that for a portion of the intense issues can be introduced to the students, it is practically unworkable or extremely hard to physically make right drawings. To overcome this trouble, the utilization of MM programming has all the earmarks of being critical. Furthermore, the utilization of this product can energize students close enough for trouble fathoming just as present a straightforward and persuading way regarding approve the arrangement. Moreover, learners can develop precise visual portrayals to display genuine circumstances productively by utilizing changes in MM programming. This can spare time widely so students can give more consideration on the practical aspects and comprehension. Astounding instructing assignments that take advantage of MM programming can likewise effectively develop student's mathematics understanding. Also an investigation is being done on engineering students after MM Training supports the statement of effectiveness of MM in teaching and learning process.

Keywords: Open Technology Integration, Mathematics Education, Microsoft Mathematics, Technology Application, Paired t-test.

I. INTRODUCTION

In the present generation new technology [1] plays vital role in understanding the concept very clear. The improvement of teachers and machines [3] in education will bring many revolutions for students understanding, particularly in visualisation concepts. MM is an open source program, intended in favour of Microsoft Windows, that permits clients to take care of the issues of mathematical sciences. MM shaped and kept up by Microsoft, it is fundamentally focused at students as an education appliance. Additionally calculator is available which you can solve difficult computations. On the opposite finish of the range you could utilize a specific all out designing suite like math works. Anyway in a ton of situations such a broad tool compartment is pointless excess. Microsoft Mathematics 4.0 is in the centre between the two finishes of the range.

You can accomplish further developed estimations from various scientific fields that are more than adequate in the vast majority of the issues.

Table 1: Information about Microsoft Mathematics

MICROSOFT MATHEMATICS	
Price	Free
Developer	Microsoft
License	Free
Operating System	Windows
Size	17.5 MB
Website	www.microsoft.com/download/details.aspx?id=15702
Stable release	4.0.1108.0000 / January 11, 2011
Topics Covered	Calculus, Statistics, Linear Algebra, Trigonometry

II. MM AS A TOOL FOR TEACHING AND LEARNING MATHEMATICS

MM program is open that has an emblematic registering framework and work dependent on mathematics communications. MM as mathematical science programming is fitting to use in help students to tackle the issues of Calculus, Statistics, Linear Algebra and Trigonometry.

2.1 Graphical Calculator

The below screen capture represents the Graphical Calculator of MM with solved trigonometry example. In this screen on the left you can extend various arrangements of options focused on a particular expert/logical field:

- Calculus : Limits, Differentiation, Integration etc.
- Statistics : Mean, Mode, Median, Variance etc.
- Trigonometry : Trigonometry and Inverse Trigonometry Functions etc.
- Linear Algebra : Matrices, Vector Calculus etc.
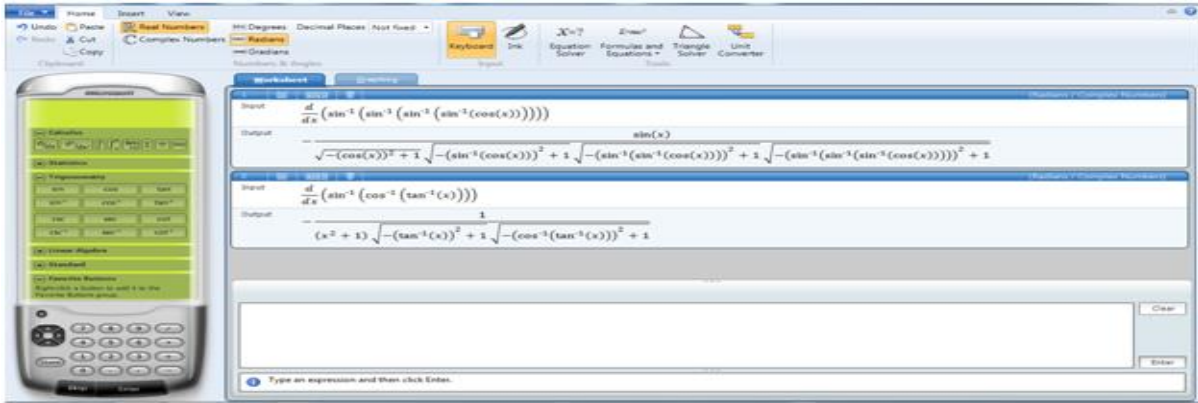- Standard : Variables, Lcm, Gcf etc,.

Fig. 2.1: Graphical Calculator of MM (Derivative of Inverse Trigonometric Function)

2.2 Equation Solver

The Equation Solver option is one of the extraordinary highlights of MM, which can assist you to explain the given equation in one step.

For suppose cubic equation $x^3 - 3x^2 - 4x + 12 = 0$ having solutions x = - 2, 2, 3 in the worksheet you can without much of a stretch plot the given equation genuinely simple in different kinds of charts. As you can find few hyperlinks under the solutions in the worksheet, which go about as the drawing alternate routes.
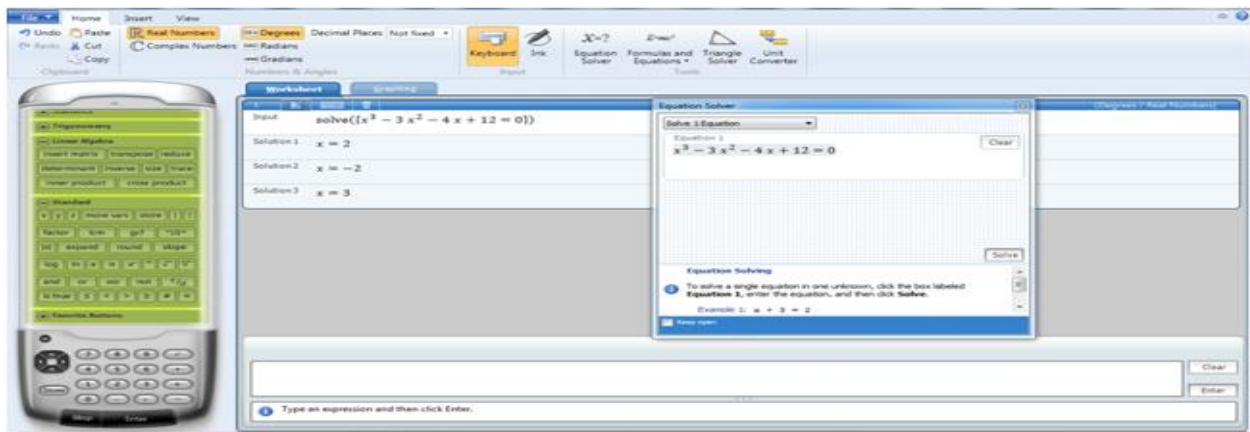

Fig. 2.2: Finding the solution (Numerical/Graphical) of equation cubic equation

2.3 Formulas and Equations

The subsequent option is called Formulas and Equations. You can pick a particular class of conditions you need to understand, starting from the pull menu: Formulas and Equations.

For instance you pick the classification Algebra starting from the pull menu. One of the conditions indicated is $r^2 = (h)^2 + (j)^2 + (k)^2$ with a one right click on the chose condition you can decide to tackle the required task. By tapping on plot the two sides of this articulation in 3-Dimensional visualisation will be produce.
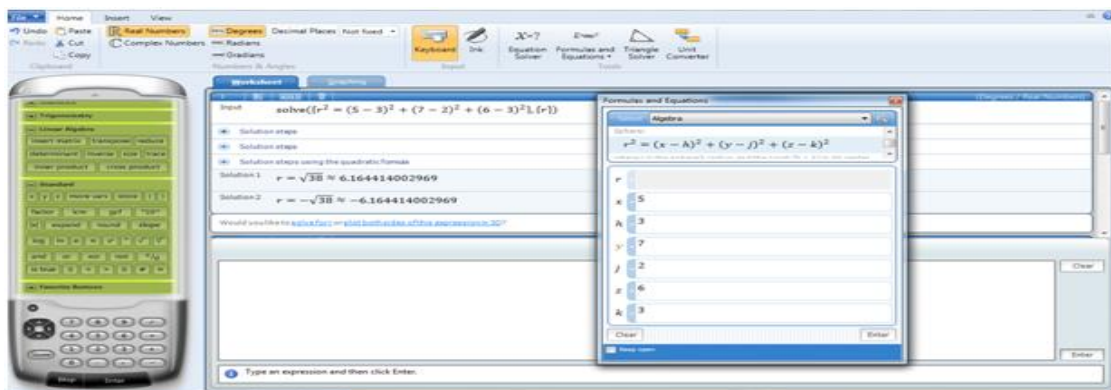

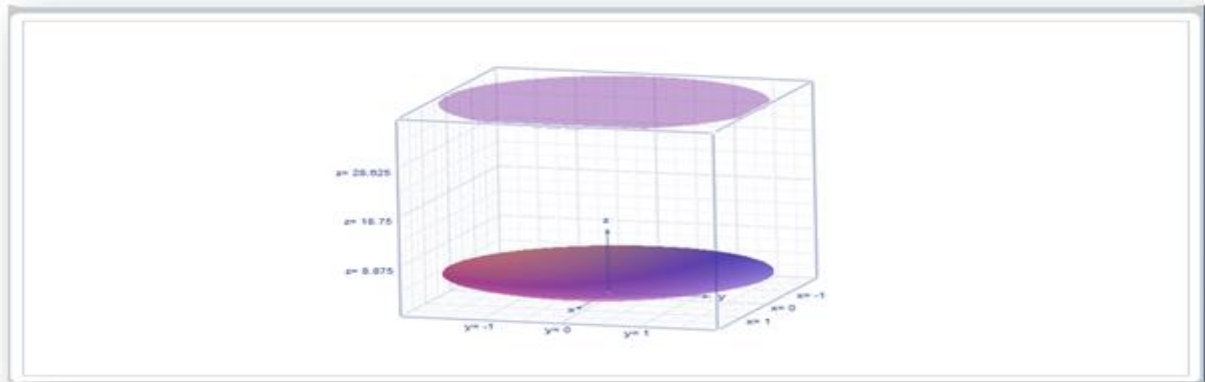**Fig. 2.3: Finding Radius of a Sphere**

Fig. 2.4: 3D Graph of Radius of a Sphere

2.4 Triangle Solver

The third option is called Triangle solver, this assists to measure the angles and sides of required triangle. Triangle solver will turn out to be extremely useful when considering the Pythagorean hypothesis. The below figure shows the essential triangle with sides of length 3 and 4 (with one right angle). Besides the pre-owned hypothesis for figuring is appeared in the centre of the triangle solver.
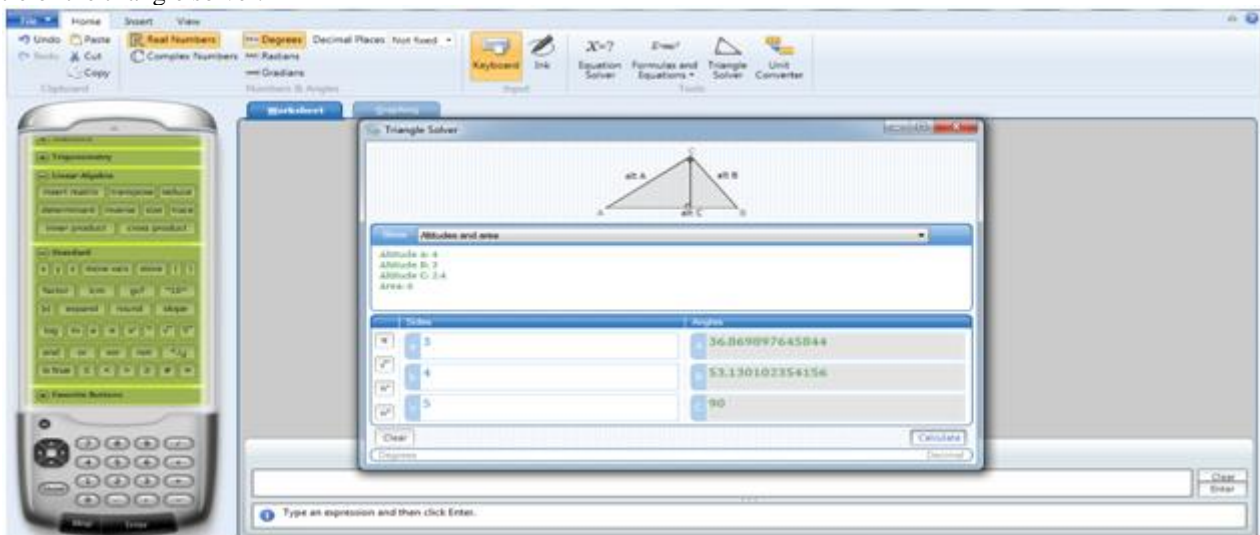

Fig. 2.5: Pythagorean Theorem (Finding area and altitudes)

III.EXPERIMENTAL REPORT ON MM

A case study was done on engineering students by taking a sample of 25 engineering students. A basic mathematical test carrying 50 marks was conducted before and after MM exposure. The following are the marks obtained by them before and after the MM training.

Table 2: Represents the marks of before and after MM training

S.no	Marks before MM training	Marks after MM training
1	25	26
2	18	30
3	26	25
4	30	28
5	23	35
6	15	38
7	45	32
8	21	26
9	16	20

10	26	25
11	29	28
12	31	26
13	32	30
14	26	29
15	40	38
16	20	25
17	35	34
18	20	25
19	40	42
20	24	30
21	30	28
22	42	35
23	23	28
24	45	42
25	16	20

Applying Paired sample t-test to investigate the effectiveness of MM in teaching and learning

Null Hypothesis: $\mu = 0$ (MM is not effective in teaching and learning)

Alternative Hypothesis: $\mu > 0$ (MM is effective in teaching and learning)

Level of Significance: $\alpha = 1\%$ (assume)

Test Statistic: $$t = \frac{\overline{x_d} - \mu}{\frac{s_d}{\sqrt{n}}}$$

Where
d is the deviations in marks,
$\overline{x_d}$ is the mean of the deviations,
n is the size of the sample,
s_d is the standard deviation.
From the data we get,

$$\overline{x_d} = -2.28$$

$$s_d = \sqrt{\frac{(d_i - \overline{x_d})^2}{n}} = 4.984$$

$$t = -11.436$$

Calculated t value is $|t| = 11.436$

Tabulated t value at $\alpha = 1\%$ and dof $\vartheta = n - 1 = 24$

$$t_\alpha = 2.492$$

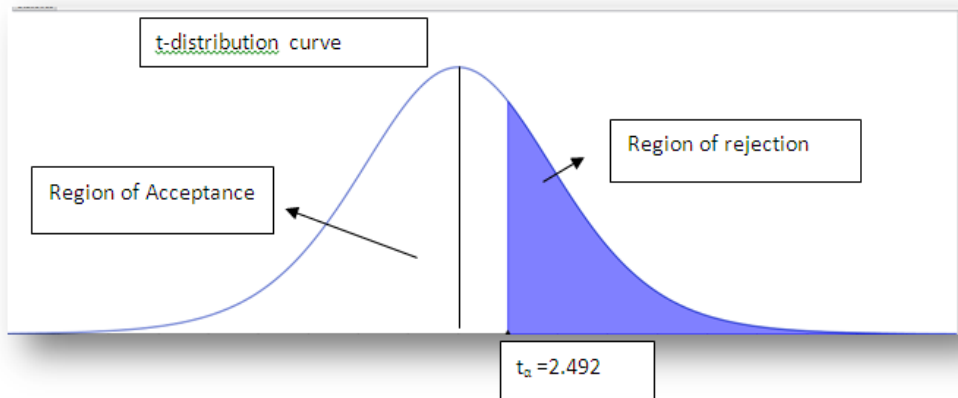## IV.RESULT:

We observed that $|t| > t_\alpha$

Fig 3.1 Graphical representation of t-distribution.

It is significant and Null hypothesis is rejected whereas Alternative Hypothesis is accepted Therefore MM is effective in teaching and learning process.

V.CONCLUSION

It is observed from multi-tasking capability of MM and experimental results, the MM is found to be effective in teaching and learning process, specifically its prominent role in understanding mathematical concepts.

An investigation on the students after MM training also supports the statement of it's efficacy.

From this investigation alongside past explores on the utilization of softwares for mathematics education goals demonstrated that applying program computer, in this study is MM, in classroom is significant to improve students' level of learning. Interactive visualization which is a branch of graphic visualization in computer science is essential components offered by MM. It encourages students to better understand in mathematics education and include concentrating how students associate with educational softwares to develop representation that isn't acquired with traditional teaching. As compared to other existing softwares, MM is considered to be user friendly, simple, easy to understand. It can be easily learnt with minimum efforts. It runs with no obstruction on any personal computer.

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