The practice of doing mathematics

There exist several critical mathematical problems that every student who is eager to learn, understand and know the ways of solving them has to understand. Mathematics is a contextual activity that undergoes a cognitive progression. There is a difference between mathematics and philosophy in that that lies behind making the statements that one is sure and those one is unsure about. The field of related processes that surround mathematics is more bound on interests of a particular mathematician. Much interest is a person can find in mathematics is the concept that can be first understood and with time gain the ability to understand the deeper meaning of the concept. It has turned out that many areas of mathematics which originally begun as a product of separate areas of interest come up become connected with one another. The fusion of various concepts of math started with Descartes who unification of geography and algebra and has processed to an extent that all the concepts can be modeled as one set (Biskup and Kotecky, 2009). Due to the modern logic formalization of set-theory, arithmetic, geometry and others we are able to ramify mathematics to pure facts.

i)Solving an algebraic equation

This is a branch of mathematics that makes substitution of numbers with letters, it can include real numbers, matrices, complex numbers or vectors

Solve for x in the following equation x2-5x+3= 0

Completing the square method

Subtract 3 from both sides x2 -5x= -3

Add (- 2 = on both sides of the equation x2 -5x + =-3 +

Simplify the right side and factor the left (x- 2 =

Take root on both sides x- =

Add to both sides

x = + = 4. 3028 the best answer, and

x =- = 0. 6972

To solve such equations, balance must be maintained on both sides what is done on one side should correspond to the other side (Lang, 2002). Like terms should also be operated the same and unlike terms should not be combined.

ii)Solving graphical problems

There method is applied to mathematical problems that require practical plotting of the on a graph where the solutions are then determined. The solution is the point of intersection found by drawing the two linear equations on the same Cartesian plane (Murphy and Harthaway, 1997).

Example

Solve graphcally the following

X + y = 8

x- y = 2

Solution

Consider equation

i) $x + y = 8$ when $y= 0$, $x= 8$(x-intercept) when $x= 0$, $y= 8$ (y-intercept)

ii)$x-y= 2$ when $y= 0$, $x= 2$ (x-intercept) when $x= 0$, $y=-2$ (y-intercept)

Therefore, when plotted on a Cartesian plane, the graph looks like this;

The solution to the above problem is the intercept of the two lines at point (5, 3)

Thus $x= 5$ and $y= 3$

iii)Solving problems by matrix

Matrix is a form of linear equations with two or more variables that can be solved simultaneously. This is a system where variables are represented by matrix equations. It’s a rectangular arrangement of numbers, expressions and symbols. Matrix of similar size can be added or subtracted (Larry and Wachowski, 2001). For Example,

Show that AX= B

A = X = B =

From the above values, we form simultaneous equations, to determine the values of x1, x2 and x3 we multiply the rows and columns respectively.

$x1 + 2\ x2 - x3 = 11$

$-x1 - x2 + 2\ x3 = 3$

$2x_1 – x_2 + x_3 = 14$

a) $x_1 + 2x_2 – x_3 = 11$

b) $-x_1 - x_2 + 2x_3 = 3$

c) $2x_1 - x_2 + x_3 = 14$

Taking the first two equations (a and b)

$x_1 = 11 + x_3 – 2x_2$

$x_1 = -3 – x_2 + 2x_3$

Therefore;

$11 + x_3 – 2x_2 = -3 – x_2 + 2x_3$

$14 = x_3 + x_2$ equation (a)

$-x_1 = 3 + x_2 – 2x_3$ $x_1 = -3 – x_2 + 2x_3$…………………(i)

$2x_1 = 14 + x_2 - x_3$

Making x_1 the subject

$x_1 = 7 + x_2 - x_3$…………………………………………………………(ii)

Thus, equation (i) = equation (ii)

$-3 – x_2 + 2x_3 = 7 + x_2 - x_3$

$-10 = x_2 - x_3$ $20 = -3x_2 + 5x_3$ equation (b)

Solving simultaneously Eqn. (a) and Eqn. (b)

$(14 = x2 + x3)5$

$20 = - 3x2 + 5 x3$

$70 = 5 x2 + 5x 3$

$20 = -3 x2 – 5 x3$

$50 = 8 x2$

$x2 = =$

Solving the value of x3 from the equation (b)

$20 = 5 x3 – 3 ()$

$20 = 5 x3 -$

$80 = 20 x3 – 75$

$155 = 20 x3$

$x3 = =$

From equation (i) ……………………………x1 = -3 – x2 + 2x3

Find the value of X1

$x1 = -3 – () + 2()$

$4(x1 = -3 - +)$

4 x1 = -12 – 25 + 62

4 x1 = 25

x1 =

Therefore, the solutions for x1, x2 and x3 are, and respectively.

Conclusion

In all mathematical problems, the order of operation is very significant when we are simplifying equations and expressions. The order defines the standards in which simplification of various operations should be done. Without these standards, different people may have different interpretation of equations and have different answers (Biskup and Kotecky, 2009).