WHO DOES MATHEMATICS AND WHO DOES NOT?

Mathematics is a systematic study of space, quantity, numbers, change and patterns or structures that are either naturally exist or constructed abstractly using the principles of logic and deductions. But aside from studying mathematics, doing mathematics is the most common phenomena in the universe. Nature itself is the ultimate mathematician which does mathematics the best – as mathematics is the official working language of nature. The sophisticated and the intricate wonders of nature, the beauty and symmetries with see, the elliptic paths planets and other galactic objects follow to rotate around a central object such as the sun, the creation and ultimate death of stars from a purely mathematical perspective, the fascinating natural process how a conception develops and the timing it requires to come out of a mother's womb, the shading of trees to hibernate and protect themselves from severe cold weather and the time they start to blossom when spring comes, the sizing of petal or leave surfaces by plants based on where they grow (arid or wet and rainy zone) to control evapo – transpiration, are few of perfect mathematical activities nature does.

 We humans try to understand how nature does mathematics, by creating abstract models that imitate nature and prove and justify the truth of things in nature. Naturally things do work and function in an optimal way with minimal errors and a small change in parameters that govern a phenomena will create a huge change on it and that shows how nature is stable in a larger perspective but at the same time chaotic locally. We can see the chaotic part of nature by looking at the effects of a very minute change in the DNA results in a huge difference in things -- for instance we humans and chimpanzees have almost similar DNA sequencing with a very minute differences, but that very small difference creates that huge species difference.

We axiomatize, theorize and hypothesis or conjecture to prove and validate what we think is naturally valid and true. For instance we hypothesize that when a ball is rolling over a frictionless inclined surface, the distance the ball will cover is directly related to the square on the time it takes to move from one point to the next and it is an empirical result that is so – just an example. So let us see the wonders of creatures who do mathematics.

I will start with a very common mathematical activity that every human being did and does from antiquity to this day. Solving a system of linear equations in several variables. A person wants to buy few items, say for instance two, but he/she has to make sure the right numbers that meet his financial budget he sets for that purpose. Thus he/she has to determine the numbers from each type to be purchased and then by multiplying the prices of each by the numbers so that the total sum should not to exceed what he has – solving systems of linear equations in several variables and that is precisely doing mathematics without writing a single equation.

Energetic athletic dog - that wants to catch a thrown freezbee that takes a certain parabolic trajectory. The dog watches the freezbee, determines the speed by which it is moving and the trajectory it is following and how far it will travel before it turns down wards and touches the ground. After all these instant calculations, the dog sets it's move and makes it's jump making a smaller trajectory in order to intercept the freezbee before it touches the ground - the dog does a perfect mathematics.

Birds – one of the most fascinating creatures of nature, the fascinating flights, swifts, turns diving and rises they make when they search for prey or when they play. Their flight mechanisms are sources of inspirations for humankind the ambition to fly. It is also a source of engineering works of designing planes in regard to air dynamics which all are imitated from birds. Their activities are sources of studies for applied mathematicians and engineers alike. Besides their fascinating acrobatic flights and perfect flawless moves they make, birds also do amazing mathematics and physics. When they move from a sky to pick a prey they see on the ground or inside a sea, the path they chose to perform their motion is not by choosing the shortest distance between where they are and where the prey is, but the path with the shortest time to reach to the prey – that path or arc is called a brachistochrone – a Greek term for shortest time, a mathematically proven curve of shortest time. It is an arc that looks like a part on a suspended cable or sometimes called a cycloid. By choosing such a perfect mathematically proven path, a path of shortest time, birds pick their prey swiftly and fly quickly – a fascinating natural act of doing mathematics.

Basket ball players - a basket ball player calculates the distance between himself and the basket board and determines the trajectory or precisely the angle at which he has to throw the ball and finally gives an instant measured initial speed and throws the ball in order it intercept the net case – precisely mathematics in action. By the way soccer players and other athletes also do the same calculations.

Another and most important example I want to mention is the dynamics of gas. Gas has the following parameters that involve in its activities, temperature and volume or space among other things. It is an empirical fact that the pressure of a gas is directly proportional to the temperature that it is under but inversely proportional to the volume the molecules occupy - the higher the temperature the higher the pressure for the gas and the smaller the volume the larger the pressure. Thus it is a fact of mathematics that to create or allow a larger volume or space reduces or minimizes pressure, of course minimizing temperature also minimizes pressure as well. Let us put these things to serve political systems of under developed or developing governments which in most cases are out right dictators or quasi- dictators which simply do business without following such a simple fact of nature. In societies under such governments, political tension or pressure is inversely proportional to a political space governments permit to decent and opposition voices and directly proportional to harshness and cruelty of the government towards its own people. If such a government is harsher, more cruel and intolerant and permits no space for opposition, no freedom of expression and no rule of law, no protection of human rights and no rights of participation in a free democratic election process, the government will face higher pressure and more descent, dislike and if it's suffocating actions continue, that lead ultimately to a forced removal of the government by society. In this context the only beings or human creatures who do not do mathematics are dictators or worst political leaders. These individuals have one and only one objective function --- political power

and their objective is:

- maximize political power with longevity

and among the many constraints they set :

minimize or not allow freedom of expression

-     : minimize or not allow a rule of law

  :

-      minimize or not allow protection of human rights

  :

-      minimize or not allow free democratic participation in elections of public servants.

With all these small or none existence amounts of space for each constraint and with a very small space of overlap, maximizing their objective function – political power with longevity is not mathematically feasible and therefore not sustainable socially either and that ultimately leads to their failures. That is why all dictators that appeared on the face of the earth failed miserably and disappeared with sever street justice from their own society and continue to fail until this day, because of their un-mathematical usage of things.

Therefore, people who do not do mathematics are dictators – unelected political leaders who assume the pinnacle political power by sheer force and who have a confused and below standard or substandard understanding of social matters, where their only speaker and guarantor of truth is barrels of guns and cruelty.