Islamize Math…Yes We Can!

اِنَّ فِىۡ خَلۡقِ السَّمٰوٰتِ وَالۡاَرۡضِ وَاخۡتِلَافِ الَّيۡلِ وَالنَّهَارِ لَاٰيٰتٍ لِّاُولِى الۡاَلۡبَابِ

Surely in the creation of the heavens and the earth, and in the alternation of night and day, there are signs for men of understanding. – Al-Quran 3:190

This is just one verse where Allah is talking about men of understanding. There are many places in the Quran where Allah has mentioned such people. These are the people who are reminded of Allah through his creations.

Islamic Schools are responsible for preparing the new generation for the changing world. However, we cannot equip students with tailor made solutions for unseen times. But we can make them deep thinkers, in the light of Quran and Sunnah, so that they become men of understanding, and use their knowledge and wisdom to become exemplary Muslim leaders of their times.

Schools presently are facing the challenge of imparting knowledge, with skills of real world applications, in an interactive environment of critical thinking – all at the same time. For Islamic schools, add to the list, the challenge of inculcating Islamic morals and values in their students.

According to the *National Assessment of Educational Progress*, while students are learning the basic information in core subject areas, they are not learning to apply their knowledge effectively in thinking and reasoning (Applebee, Langer, & Mullis, 1989).

*This is where cross curricular integration comes in. David Ackerman and D.N. Perkins write in their book ‘Interdisciplinary Curriculum’ that* curriculum integration embraces not just the interweaving of *subjects* (e.g., science and social studies) but of any *curriculum elements* (e.g., skills and content) that might be taught more effectively in relation to each other than separately. The most obvious payoff is a gain in students' mastery of the metacurriculum — improvement in thinking and learning skills. Accordingly, systematic attention to it will yield at least some valuable learning of higher-order skills.

Just as important are likely gains in the mastery of the subjects. We can expect at least equal, and often better, content retention. We can expect deeper understanding of the subject matter and improved problem solving, particularly on “transfer” problems that ask students to apply their knowledge in new situations. Beyond higher-order skills and deeper content mastery, we can expect improvements in broader and subtler characteristics of the learner. Students are likely to become more autonomous and proactive in their conduct as thinkers and learners. They are also likely to be more prepared to make connections between contexts that at first seem quite separate.

Islamic schools go a step further. We call it Islamization.

*Sa’eda Buang and Phyllis Ghim-Lian Chew Routledge write in their book ‘Muslim Education in the 21st Century’,* *Islamization refers to the integration of modern sciences and Islamic sciences as one unifying body of knowledge. Besides adding religious subjects into the curriculum, it is the incorporation of religious elements and values into the teaching of general subjects such as Mathematics, Physics, Biology, and English. According to Pak Marwan, a mathematics teacher, a simple attempt to ‘Islamize’ math, for instance, is to link the lesson of fractions to ‘faraid’ (the Islamic division of inheritance). A greater challenge, however, is for the teacher to excite the students in using Islamic parallel examples through creative and effective pedagogy.*

In this presentation I have attempted to use the wisdom that Allah (swt) has given to integrate teachings of Islam with mathematic concepts.

ORDER OF OPERATIONS

Correct order of operations is *PEMDAS* (Parenthesis, Exponents, Multiplication, Division, Addition, and Subtraction) – The infamous mnemonic known as ‘Please Excuse My Dear Aunt Sally’ – Reflecting on the words of the Quran that mentions ‘people of understanding’ time and again, we say, Pondering Every Moment Defines Allah’s Slave.

HORIZONTAL NUMBER LINE

Positive numbers represent good deeds, negative numbers represent bad deeds. Addition/subtraction of integers is analogous to compilation of deeds on the Day of Judgment on the scale/meezan. Rightward arrow to infinity represents Ashab-ul-Yameen, and leftward arrow to negative infinity represents Ashab-ul-Shimaal.

And true will be the weighing on that Day: and those whose weight [of good deeds] is heavy in the balance – it is they, they who shall attain to a happy state.– Al-Qur’an 7:8

Example: -2 - (-4)

the scale begins with two bad deeds, then four bad deeds (-4) are taken away (-).

The good deeds take away the bad. This is a reminder to those who remember – Al-Qur’an 11:114

Subtracting(-) bad deeds(-) is good (+)

Hence, -2+4. Two on the left and four on the right side of the meezan. Right side is heavier by 2. \*Answer (+2)

Then who so is given his account in his right hand, he truly will receive an easy reckoning.– Al-Qur’an 84:8

It was narrated that Abu Hurayrah RA said: The Messenger of Allah (PBUH) said: “Whoever has wronged his brother with regard to his honor or anything else, let him seek his forgiveness today, before there will be no dinar and no dirham, and if he has any good deeds to his credit they will be taken from him in a manner commensurate with the wrong he did, and if he has no good deeds, then some of his counterpart’s bad deeds will be taken and added to his burden.” – Al-Bukhaari

Subtracting(-) good deeds(+) is bad(-)

3-4=?

+3-+4=?

+3-4= -1

Adding(+) bad deeds(-) is bad(-)

3-4=?

+3+-4=?

+3-4= -1

VERTICAL NUMBER LINE

Upward arrow to infinity represents Jannat-ul-Firdous, and downward arrow to negative infinity represents Hawiyah. \*Answer (+2). This means two points above zero on the vertical number line. Zero on the vertical line represents ‘People of A’raf’. Their good and bad deeds equal out to zero.

And between them will be a barrier screen and on *Al-A'raf*(a wall with elevated places) will be men (whose good and evil deeds would be equal in scale) – Al-Qur’an 7:46

POINT ON A COORDINATE PLANE

Graph point P at ( 2, -3 )

( x , y ) The first number is on the meezan. In this case positive two (Ashab-ul-Yameen). The second number is the placement level in Jannah or Jahannum. In this case negative three. (Towards Hawiyah).

MULTIPLYING AND DIVIDING BY POWERS OF 10

Allah(swt) says that the night of power is better than a thousand (103) months. When we multiply numbers by powers of ten, we are aiming to multiply our good deeds, which are towards the right. Hence, the decimal moves towards the right as many place values as the power of ten. On the contrary, we want to divide our bad deeds (left), so dividing by powers of ten means moving the decimal to the left as many place values as the power of ten.

DISTRIBUTIVE PROPERTY

But when you enter houses, give greetings of peace upon each other - a greeting from Allah , blessed and good. Thus does Allah make clear to you the verses [of ordinance] that you may understand. – Al-Qur’an 24:61

4(3t+7) = 12t+28

A Muslim is always in the state of da’wah, distributing the message of Allah, which multiplies his blessings. The factor ‘4’ outside knocks on the door. The door (parenthesis) opens, blessings multiply when ‘4’ says As-Salamu-Alaikum to ‘3t’, and then ‘4’ says As-Salamu-Alaikum to ‘7’.

The result is 12t + 28 – unlike terms which cannot be added. They are different and we identify this difference.

O mankind, indeed We have created you from male and female and made you peoples and tribes that you may know one another. Indeed, the most noble of you in the sight of Allah is the most righteous of you. Indeed, Allah is Knowing and Acquainted. – Al-Qur’an 49:13

SLOPE-INTERCEPT FORM OF A LINE

y=mx+b.

y=3x-4

‘B’ for ‘Bismillah’, which we say when we begin. We begin in the name of Allah. Point the index finger to the sky, which also indicates the vertical axis. Therefore, begin at ‘b’ on the y-axis. In this case four units below zero. ‘m’ is for Mustaqeem. The slope that determines the straight line.

Guide us to the straight path – Al-Qur’an 1:6

In this case ‘m’ is 3. Move up three units for every unit to the right. Journey of a Mu’min is always from left to right. The attributes of Allah - ‘Mu’izzu’ The Giver of Honor can be seen in this line going up. ‘Muzillu’ The Giver of Disgrace is seen in a line going down. That’s the faith/Qadr of the line.

PYTHAGOREAN THEOREM

Worship Allah and associate nothing with Him, and to parents do good, and to relatives, orphans, the needy, the near neighbor, the neighbor farther away, the companion at your side, the traveler, and those whom your right hands possess. Indeed, Allah does not like those who are self-deluding and boastful. – Al-Qur’an 4:36

Prerequisites to Jannah are right actions (90 degrees). Two b a rights need to be fulfilled: The rights of Allah (a) and rights of the people (b…in Arabic). a + b equals c (crossing into Jannah) c b a which is the longest and the hardest path. But no one can enter Jannah without Allah’s mercy, which is exponential. Hence, the exponents, a2+b2=c2

SYSTEM OF EQUATIONS

Parallel Line

Let not believers take disbelievers as allies rather than believers. And whoever [of you] does that, will never be helped by Allah in anyway. – Al-Qur’an 3:28

Parallel lines never meet. They are inconsistent.

In the grand scheme of life, Muslims coexist in harmony with people of different religious beliefs and values. There is no point of commonality.

Intersecting Lines

The believers are but brothers, so make reconciliation between your brothers and fear Allah that you may receive mercy. – Al-Qur’an 49:10

* Consistent Lines that intersect at one point are independent.

A Muslim will always have the goals of Islam common with another Muslim. Religion is the point of commonality.

And fear Allah, through whom you ask one another, and (do not cut the relations of) the wombs (kinship). Indeed Allah is ever, over you, an Observer. – Al-Qur’an 4:1

* Consistent Lines that intersect at every point are Dependent.

A Muslim is responsible for his next to kin. Every moment is a point of commonality. The relationship is dependent on each other. It can never be severed

TWO STEP EQUATION

An equation has two sides. **Deen** and **Dunya**.

What you do on one side is recorded on the other side

(goal is to isolate the variable...prepare for the final journey alone)

Every soul will taste death. – Al-Qur’an 3:185

Two step equation: 3x + 10 = 25

In my life, I am the variable (x), and I am part of my family, in this case, 3x.

Worldly possessions is what I own (+10).When death comes upon me, first I will lose whatever worldly possessions I own.

3x + 10 - 10 = 25 – 10

Then my family will bury me in the grave for the final journey

3x = 15

3 3

x = 5

Two step equation: 3x - 20 = 100

What if I am in debt (-20). When death comes upon me, first someone has to pay off my debt or the debt has to be forgiven.

3x - 20 + 20 = 100 +20

Then my family will bury me in the grave for the final journey

3x = 120

3 3

x = 40

ABSOLUTE VALUE

And it is He who accepts repentance from his servants and pardons misdeeds, and He knows what you do. – Al-Qur’an 26:25

When we raise both our hands (in making dua for forgiveness) to the absolute being – Allah SWT – He forgives all our sins.

Good deeds stay good.

|10| = 10

Bad deeds are replaced by good deeds.

|-10| = 10

Except for those who repent, believe and do righteous work. For them Allah will replace their evil deeds with good. And ever is Allah Forgiving and Merciful. – Al-Qur’an 25:70

TRANSITIVE PROPERTY OF EQUALITY

The Prophet ﷺ said, ‘You will not enter paradise until you have faith. And you will not complete your faith until you love one another’ – Al-Bukhari

Paradise = not without Faith

Faith = Not without love for one another

Paradise = Not without love for one another

Transitive property of equality: If **a** = **b** and **b** = **c,** then **a** = **c**

BASE AND HEIGHT OF TRIANGLES

Men are the protectors and maintainers of women, because Allah has made one of them to excel the other and because they spend from their means. Therefore, the Righteous are Qanitat and guard in the husband’s absence what Allah orders them to guard. – Al-Qur’an 4:34

Allah has given men and women different roles in the society, of which they will be questioned on the Day of Judgment. Just because men and women share or delegate their roles to each other sometimes, doesn’t mean they will not be held accountable for it. Given that, the husband (h) will always be the pillar of the house (height), whether he’s working from home (dotted line showing height inside the triangle), at home (leg of a right triangle), or away from home (dotted line showing height outside the triangle).

And he will have a righteous bride who will always be the base of his home. One side/leg of the triangle at right angles with the height. The ‘h’ and ‘b’ are always at right angles with each other.

QUADRATIC FUNTIONS

But they who believe and do righteous deeds – those are the companions of Paradise; they will abide therein eternally. – Al-Qur’an 2:82

y=ax2+bx+c

When the leading coefficient ‘a’ is positive

(righteous deeds) quadratic function opens

upwards – journey towards paradise.

Surely Allah has cursed the unbelievers and has prepared for them a burning fire, in which they will remain forever, and will not find any guardian or helper. – Al-Qur’an 33:64-65



y=ax2+bx+c

When the leading coefficient ‘a’ is negative (bad deeds) quadratic function opens downwards – journey towards hawiyah.

COORDINATE PAIR

And that it is He who has created in pairs, the male and the female –

– Al-Qur’an 53:45

In the genetic makeup of animals there are two types of sex chromosomes: X and Y (X: Female, Y: Male).

Amusingly, a point on a Cartesian plane is graphed with the combination of an x-coordinate and a y-coordinate. (x,y). Just like Allah swt has created every pair as male and female.

And [mention] Lot, when he said to his people, "Indeed, you commit such immorality as no one has preceded you with from among the worlds. – Al-Qur’an 29:28

Allah has deemed haram the intimate physical relationship of man with man, or woman with woman. It is as unnatural and unacceptable as it is impossible to graph a point with a pair of two x’s (x,x), or a pair of two y’s (y,y).

Conclusion

And certainly We have left a clear sign of it for a people who understand – Al-Qur’an 29:35

In the above verse, Allah (swt) is talking about the punishment that was sent to the people of Lot. He, once again, mentions the people of understanding.

For me, Islamizing math is connecting logic with its Creator. Each teacher is different, and may Islamize differently. But in the end what matters is that the spark between the students and their Creator is kindled.

# *What you think a school should be like depends on the values you hold. What a school is like results from the values of those who dominate it. Values – the fundamental beliefs that guide all levels of action – are particularly reflected in the curriculum the school offers. Curriculum includes not just the subjects taught, but also the choices made within those subjects, the styles and means chosen to teach them, the activities, attitudes, environments, relationships, and beliefs that pervade a school.* –Jonathan Barnes (Cross-Curricular Learning 3-14)

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January 2017

References\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

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