Sumthin: A Context Dependent Slang Used on the Streets to Depict Unknown Variables

(An Attempt to Translate a Popular African American Expression into Algebra)

Makafui Apedo

mkmaili@yahoo.com

Abstract

Variables are the fundamental blocks upon which Algebra is built. Algebra as we know it today, was created using basic language of the common people. Early Arabic texts in Algebra were written in plain language; It was later that mathematicians used letters, Hindu numerals, and notations to represent words. So, it was easier to read equations then than it is now. This also means that every human language, whether formal or informal can enable Algebra. In this paper, I demonstrated the word 'sumthin' (pronounced "sum"), a context-dependent slang that depicts unknown amount of money that change, as a synonym for a variable.

Introduction

For many years, there has been hue and cry over the low interest in Mathematics among inner-city children, most especially Algebra. My take on this debacle is that interested parties should always look for ways to spark interest in the subject.

Since every society, be it the school environment or the inner cities, has ways of expressing themselves, an exploration of popular jargon in the inner cities can lead one to find terms that relate to terms used in the academic environment. Identifying the popular arithmetic and algebraic terms is necessary for formalizing basic mathematical expressions upon which basic algebraic equations can be developed.

Since Algebra is built on variables, our task is to find a word or an expression in the inner cities that relates to variables, which students can perhaps be receptive to; and can be used to teach and demonstrate the concept. In the inner cities of North America, one such word is "sumthin", a context-dependent slang used to represent unknown amount of money that varies, in the practice of borrowing and lending. Explaining variables using this term can enhance clarity and allow children to create Algebraic expressions. It is also necessary to note that Al-Kwarizmi, the father of Algebra and other trailblazers of the art, such as Abu Khamil and Omar Khayyam used the word 'thing' to represent variables (Mūsá and Rosen, P.35,86). Also, most African languages use words that literally translates to 'thing' or 'something' to represent unknown amounts of money.

Demonstration

1. *lemme hold a two till I get right.*
2. *lemme hold sumthin till I get right.*

The two expressions above represent two branches of mathematics: namely Arithmetic and Algebra. The first one is Arithmetic because it is about a known number and nothing beyond that. We can operate on this number by splitting it into three or by adding another number to it. The second one used the word 'sumthin' in place of a number. Deciphering the rationale behind the use of this word instead of a number can lead one to unpack the meaning of the word in the context in which it is being applied. We can also unfold the meaning by contrasting the expression with the first one. I contend that it is algebraic. What is Sumthin? Sumthin is an unknown mutable value. Sumthin is something whose value is not fixed: in other words, the value of sumthin can vary. If you say: 'lemme hold sumthin', the amount you are requesting is unknown to you and will become known to you if you count and perform the operation of addition on the coins deposited in your palm. You can express it using a letter as 'lemme hold x'. As you wait for the value, you can perform various operations on sumthin. You can take sumthin two times like sumthin plus sumthin $(x + x)$, or three times like sumthin plus sumthin plus sumthin $(x + x + x)$ or you can take it times itself like sumthin times sumthin $(x \times x)$. If after counting and adding, the value turns out to be four, then sumthin equals four. We can write it as $x = 4$. Two times sumthin becomes $(4 + 4)$ and three times sumthin becomes $(4 + 4 + 4)$. Sumthin times sumthin becomes (4×4) or $(4 + 4 + 4 + 4)$. Assuming you went back and said: 'lemme hold sumthin'. If it turns out to be one, then sumthin equals one or $x = 1$. Two times sumthin becomes $(1 + 1)$. Three times sumthin becomes $(1 + 1 + 1)$ and sumthin times sumthin becomes (1×1) or (1). So sumthin can take on various or different values. It can also be an unknown immutable value like the one in the equation $1 + x = 5$. This equation can be read as one plus sumthin equals five. Let's assume you wake up at three o'clock at dawn to think about life and at one instance said: 'I have sumthin in my pocket; I'll let Jason hold the two dollars I owe him, and then save the rest for tomorrow", this can be expressed algebraically as sumthin minus two $(x - 2)$. The value of sumthin will be determined if you count and add the coins in your pocket.

Manupulating and Diagramming the Expressions

Arithmetic

Jason: yo! I'm tight! Ain't got nuthin! lemme hold a two till I get right.

Daniel: Anytime, anytime!

Slang Translation

Jason: yo! I'm tight! Ain't got nuthin! lemme hold a 2 till I get right.

Daniel: Anytime, anytime!

Jason: I'm 4 short Jamal so imma take this 2 times itself.

$2 \times 2 = 2 + 2 = 4$

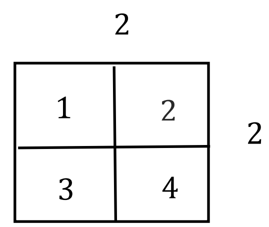


Figure 1: Multiplication of two by itself.

Jason: I’m 6 short Sakeena so imma take this 2 three times.

$2 \times 3 = 2 + 2 + 2 = 6$

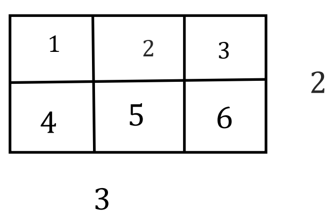


Figure 2: Multiplication of two by three.

Jason: 4 plus 6 equals 10. I’m 10 short my friends! Will add the rectangle to the square!

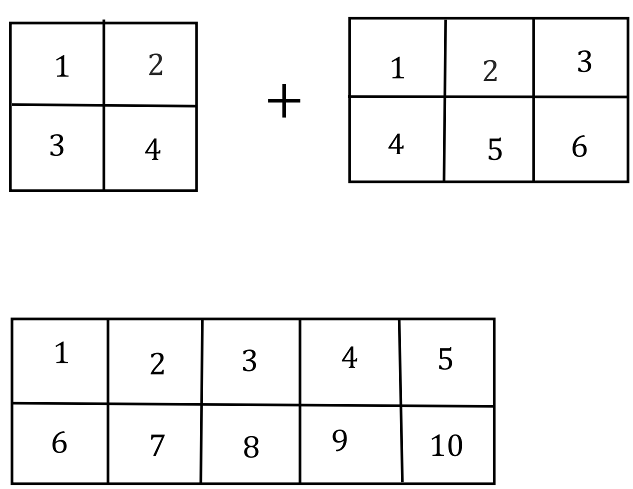


Figure 3: Addition of figure (1) and figure (2).

Jason: yo! I'm tight! Ain't got nuthin! lemme hold sumthin till I get right.

Daniel: Anytime, anytime!

Slang Translation

Jason: yo! I'm tight! Ain't got nuthin! lemme hold x till I get right.

Daniel: Anytime, anytime!

We know from the first example that 2×3, which gives us 6, is rectangular in shape. We can thus infer that a number times a different number gives a rectangle. We've also observed that 2×2, which is 4, has the shape of a square. So, any number times itself gives the shape of a square. So sumthin times itself must give a square. Likewise, sumthin times another sumthin must give a rectangle; like if Delali want to let Jason hold sumthin and Elikplim also want to let Jason hold sumthin. So sumthin and another sumthin or a different sumthin.

So, sumthin times itself or sumthin times sumthin equals a square.

It means $x \times x = x^2$. This gives the shape of a square. It is written as x^2 because according to the laws of indices, x is the same as x^1. Now if we multiply two indices with the same base, we add the exponents. So $x \times x = x^1 \times x^1 = x^{1+1} = x^2$.

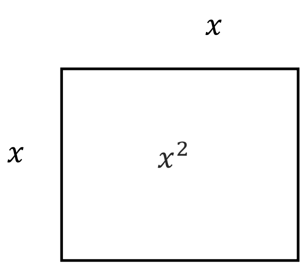


Figure 4: The multiplication of sumthin by itself.

Sumthin times another sumthin gives rectangle.

It means $x \times y = x^1 \times y^1 = x^1y^1 = xy$

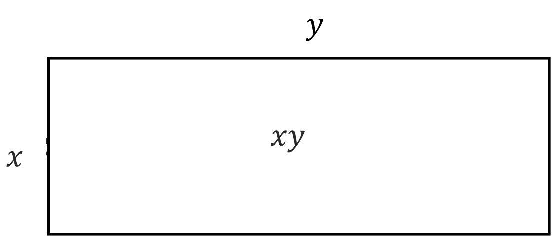


Figure 5: sumthin times another sumthin.

Likewise, $x \times 7 = 7x$ is a rectangle because it ain't sumthin times sumthin! But rather sumthin taken seven times.

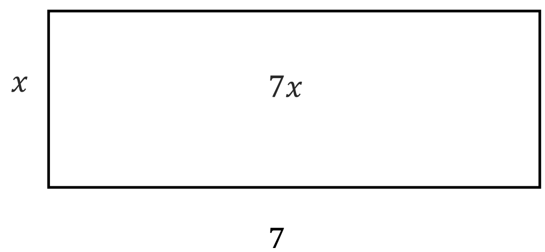


Figure 6: Multiplying sumthin seven times.

Now let's add the square and the rectangles:

$\boldsymbol{x^2 + xy}$

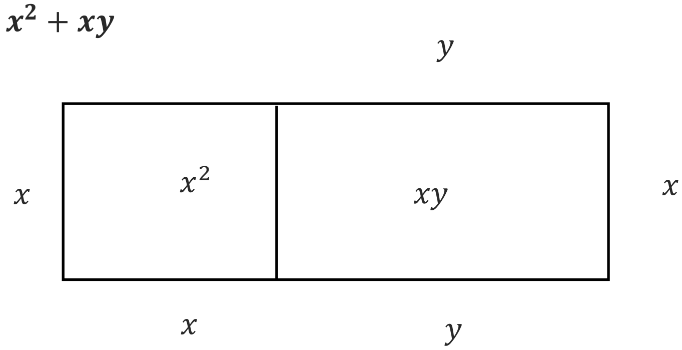


Figure 7: Addition of (4) and (5).

$\boldsymbol{x^2 + 7x}$

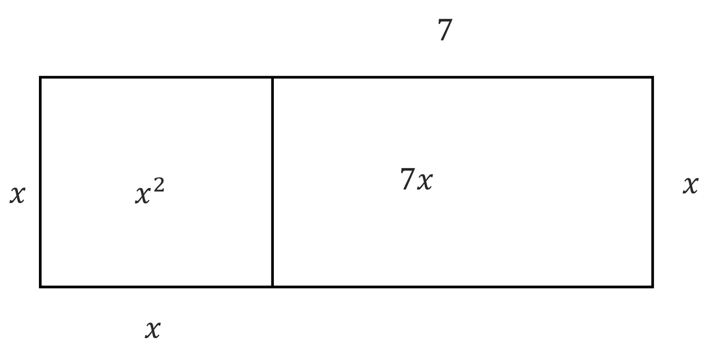


Figure 8: Figure 7: Addition of (4) and (6).

Jason: yo! I'm tight! Ain't got nuthin! lemme hold sumthin till I get right.

Daniel: bro, I'm tight too! Ain't got nuthin!

In this case we know the value of sumthin is nuthin. In other words, $x = 0$.

Making up Algebraic Expressions

Algebraic expressions can be created by mutating the second expression or by a synthesis of the first expression and the second expression. A simple case would be taking half of sumthin $(\frac{1}{2}x)$ or by synthesizing the two expressions in the form of two plus sumthin $(2 + x)$.

1. Let's assume at the end of each day, your mum lets you hold a five and your friend lets you hold sumthin. This means that at the end of each day, you hold a total of five plus sumthin. You can take the total amount at each day's end; that is five plus sumthin, split it into three equal parts and give one part to James; that is five plus sumthin, divided by three. It means James gets one-third of five plus sumthin every day, which is one and two-thirds, plus one third of sumthin. The rest, which is yours, is two-thirds of five plus sumthin, which equals three and one-third plus two-thirds of sumthin. You can take the total each day two times, which is five plus sumthin added to five plus sumthin. This gives ten plus two times sumthin. You can also multiply the total by itself; that is five plus sumthin, times five plus sumthin. This gives sumthin times sumthin, added to ten times sumthin, added to twenty-five. You can convert it into an equation by equating it to zero. This becomes sumthin, if multiplied by itself and ten times itself is added and then twenty-five added, you get nuthin!

Total $= (5 + x)$. It implies $\left(\frac{5+x}{3}\right) = 1\frac{2}{3} + \frac{1}{3}x.$ This means $(5 + x) - \frac{1}{3}(5 + x) = \frac{2}{3}(5 + x) = 3\frac{1}{3} + \frac{2}{3}x.$ Also $(5 + x) \times (5 + x)$ $\therefore x^2 + 10x + 25 = 0.$

2. Let's assume you let your little sister hold sumthin every day; your brother also let your little sister hold sumthin every day and your mum let your little sister hold a five every day. This means that your little sister holds a total of sumthin, plus another sumthin, plus a five every day. In case you want to take the total three times, you will get three times sumthin, plus three times another sumthin, plus fifteen. You can equally take the total times itself, that is sumthin plus another sumthin plus a five, times sumthin plus another sumthin plus a five. This gives you sumthin squared, plus another sumthin squared, plus

two times sumthin times another sumthin, plus ten times sumthin, plus ten times another sumthin, plus twenty-five. Your little sister can split it equally between her two friends. This gives half of sumthin squared, plus half of another sumthin squared, plus sumthin times another sumthin, plus five times sumthin, plus five times another sumthin, plus twelve and a half.

Total $= x + y + 5$. It implies $3 \times (x + y + 5) = 3x + 3y + 15$. Now $(x + y + 5) \times (x + y + 5) = (x + y + 5)^2 = x^2 + y^2 + 2xy + 10x + 10y + 25$. $\frac{x^2+y^2+2xy+10x+10y+25}{2} = \frac{1}{2}(x^2) + \frac{1}{2}(y^2) + xy + 5x + 5y + 12\frac{1}{2}$.

3. Imma ask my dad to lemme me hold sumthin. From that, I will let Tiara hold a fifth and Briana hold seven ninth. I will keep the rest for myself. We can express this algebraically as sumthin minus a fifth of sumthin, minus seven-ninth of sumthin $(x - \frac{1}{5}x - \frac{7}{9}x)$. You can also say my dad is going to let me hold sumthin. My mum will also let me hold sumthin. I will take a fifth from my dad's and add the rest to two thirds taken out of my mum's. This can be expressed as sumthin minus a fifth of sumthin, added to another sumthin minus two-thirds of another sumthin $(x - \frac{1}{5}x + y - \frac{2}{3}y)$.

4. My three friends will each let me hold sumthin. I will in turn let each of my three sisters hold half of each and save the rest. This can be expressed as sumthin minus half of sumthin, plus another sumthin minus half of another sumthin, plus the third sumthin minus half of the third sumthin $(x - \frac{1}{2}x + y - \frac{1}{2}y + z - \frac{1}{2}z)$. You can also refer to them as the first sumthin, second sumthin and the third sumthin.

5. Like I said, I have fifteen in my pocket; I will let you hold sumthin out of it. Afterwards, I will multiply what I let you hold with what I have left. Let's call what I let you hold sumthin. Subtracting this from what I have will give us the remainder. So, the remainder equals fifteen minus sumthin. The expression becomes sumthin, times fifteen minus sumthin. This gives us fifteen times sumthin, minus sumthin squared. $(x) \times (15 - x) = 15x - x^2$.

6. I will just let you add sumthin to the sumthin I have; afterwards, I will square everything and see what I got. This can be expressed as sumthin plus another sumthin, times sumthin plus another sumthin. This gives us sumthin squared plus two times sumthin times another sumthin, plus another sumthin squared $(x + y)^2 = (x + y) \times (x + y) = x^2 + 2xy + y^2$.

7. I have sumthin in my pocket, I will let you hold sumthin out of it when we get home.We can express this as sumthin minus a little sumthin; and since a little sumthin is different from sumthin, we can call it another sumthin or sumthin different $(x - y)$.

8. One-third of sumthin, plus seven equals ten ($\frac{1}{3}x + 7 = 10$).

9. After letting him hold a five and dividing the rest equally between his three children, what was left was a two. This can be expressed as sumthin minus five, divided by three, equals two ($\frac{x-5}{3}) = 2$.

Sumthin is the root of all Evil

Money, they say, is the root of all evil. The preacher told the congregation the fear of God is at the root of wisdom. His honesty is at the root of his success. At the root of her life is her parents' love. The root of a tree is at its core. I have digressed! Why do I always digress? At the root of my digression is old age! Let's get back to the main topic. Sumthin is at the root of all squares! At the core of all squares is sumthin. What makes a square a square is sumthin. What did you multiply by itself to get a square? This is what is meant when they talk about the root of a square. Obviously, the answer is sumthin. The root of the square is sumthin! $x \times x = x^2$. This means that $\sqrt{x^2} = x$. Geometrically, this also means that one side of a square is sumthin or it's root. If the area of sumthin squared is $36cm^2$, then one side or the root or sumthin will be $\sqrt{36cm^2} = 6cm$. If the area of sumthin squared is $49cm^2$, then the root or the side or sumthin will be $\sqrt{49cm^2} = 7cm$. Sumthin, I tell you, can vary like a variable!

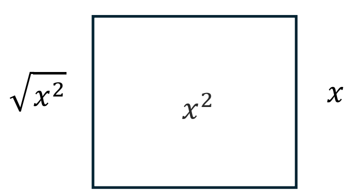


Figure 8: Taking the root of a square.

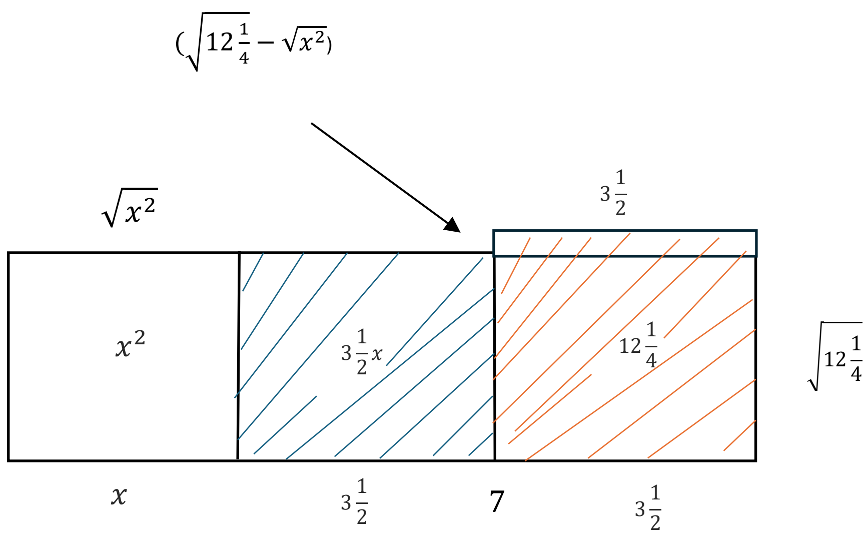
Playing and Being Creative with them Roots

Let's get back to the rectangles and the squares. Sumthin times sumthin, added to seven times sumthin. If we split the seven times sumthin vertically into two equal parts, one part will be three and a half times sumthin; the other part will be the same. If we take one side of one part, that is three and a half, times itself, it gives us twelve and a quarter, which is a square!

$x^2 + 7x.$

If we take $7x$ which is the rectangle and split it into two equal parts, we'll get $\frac{7x}{2} = 3\frac{1}{2}x$. Now if we take one side, that is $3\frac{1}{2}$ times itself or square it like $3\frac{1}{2} \times 3\frac{1}{2}$, or $(3\frac{1}{2})^2$, we'll get $12\frac{1}{4}$ which is obviously a square. So, the whole expression is $x^2 + 3\frac{1}{2}x + 12\frac{1}{4}$.

Now let's represent this with rectangles and squares; assuming the value of sumthin is less than $3\frac{1}{2}$.

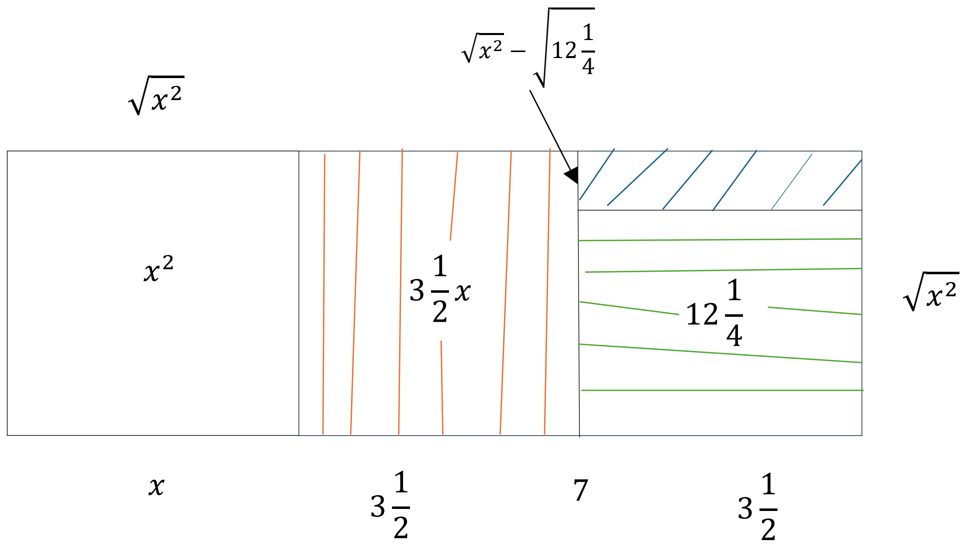


The expression or the area of the four shapes can be re-written as:

$$3\frac{1}{2} \times \left(\sqrt{12\frac{1}{4}} - \sqrt{x^2}\right) + 2 \times \left(3\frac{1}{2}x\right) + (\sqrt{x^2})^2$$

Figure 9: Demonstrating the shape and area when sumthin is less than half the side of the rectangle.

Again, let's represent this with rectangles and squares; assuming the value of sumthin is greater than $3\frac{1}{2}$.



The area or the the expression can be written as:

$$3\frac{1}{2} \times \left(\sqrt{x^2} - \sqrt{12\frac{1}{4}}\right) + (3\frac{1}{2})^2 + 3\frac{1}{2}x + x^2$$

Figure 10: Demonstrating the shape and area when sumthin is greater than half the side of the rectangle.

Discussion

Using this slang to denote unknown variables implies that Algebra developed as a logical necessity in human communication. As we've seen, the two expressions indicate the person seeking the aid has two logical choices to make. Either to be specific or unspecific. The resolution of the unspecific or the obscure to the specific is also a logical necessity, hence the birth of Algebra. Algebra is therefore an art of seeking information or knowledge.

As to whether algebra is apriori or aposteriori, we can infer from our demonstration of sumthin times sumthin equals a square, that deductive reasoning was employed to logically deduce it from the prior arithmetic demonstration. In our words: "… We've also observed that 2×2, which is 4, has the shape of a square. So, any number times itself gives the shape of a square. So sumthin times itself must give a square". Its reasoning and form stem from the prior arithmetic reasoning. However, we must clarify what we mean by 'observe' before we can take a stand.

Also, from the title of our paper, we can deduce the proposition ‘a variable is an unknown magnitude’. This proposition would be classified as analytic apriori because the concept of the subject variable is contained in the concept of the predicate, unknown magnitude.

Furthermore, the proposition ‘algebra is built on variables’ is synthetic apriori. We can arrive at this judgment through reason alone. We’ve defined Algebra as an expression that can be created by mutating the second expression or by a combination of the first and second expression. It is self-evident truth that these expressions are built on variables. However, we must also take into consideration that we come to know Algebra is built on variables by drawing on the experience of observing the expression $(\frac{1}{2}x)$ and $(2 + x)$.

Moreover, from the sample expressions we can see that the common man on the street with no education thinks algebraically. Algebra henceforth is not an art limited to the classrooms, but since it comes naturally with human speech, it can be found anywhere. The academic environment is where it is structured, clarified and advanced. The schools are where its application is extended to cover other magnitudes such as time and speed among others.

Conclusion

When I asked my friend Charles what sumthin is, he said : “ Sumthin is anything; it can be a one, a two, a three, just anything”.

Y’all are doing Algebra on a fundamental scale if y’all use such slang in y’all communications.

I believe I have demonstrated the slang ‘sumthin’ is synonymous with the word ‘variable’ and can be used verbatim to read an expression. If this is true, it is necessary for parents to help their children make up their own stories and convert them to expressions and equations. Doing these exercises in their homes can serve as a warm-up for an Algebra course in their schools.

References

Muḥammad Ibn Mūsá Khuwārizmī, & Friedrich August Rosen. (1831). *The algebra of Mohammed Ben Musa*. London.

https://www.urbandictionary.com/define.php?term=let%20me%20hold%20somethin