The Jami Formula

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This Article is about The Jami Formula, a mathematical formula for a special solution of cubic equations to find the exact roots of a cubic function and about the Jami Theory for a new general formula to solve cubic equations.

I will explain the formula and then I will show you the mathematical proof of it:

In order to apply the special solution of a cubic equation, the equation's coefficients must have a specific relation to each other.

The general form of a cubic function is:

$$f(x) = ax^3 + bx^2 + cx + d$$

The finitary relation:

$$\frac{b}{a} = \frac{d}{c}$$

If this applies, then it will be possible to use the Jami Formula to find the roots of the function.

The Jami Formula

Given:

$$\frac{b}{a} = \frac{d}{c}$$

It applies:

$$x_1 = -\frac{b}{a}$$

$$x_2 = \sqrt{-\frac{d}{b}}$$

$$x_3 = -\sqrt{-\frac{d}{b}}$$

If $\frac{d}{b} < 0$, the cubic function has three real roots.

If $\frac{d}{b} > 0$, the cubic function has only one real root with two complex roots.

The mathematical proof

The general form to create cubic functions with 3 specific roots is:

$f(x) = (x - x_1)(x - x_2)(x - x_3)$

According to the Jami Formula is:

$x_3 = -x_2$

Therefore we have as follows:

$f(x) = (x - x_1)(x - x_2)(x + x_2)$

The roots will be replaced with two new variables:

$A = x_1$; $B = x_2$

$f(x) = (x - A)(x - B)(x + B)$

$f(x) = (x - A)(x^2 - B^2)$

We expand by multiplication and we get:

$$= x^3 - Ax^2 - B^2x + AB^2$$

It results to:

$x_1 = -A$

$x_2 = \sqrt{-B^2}$

$x_3 = -\sqrt{-B^2}$

The general form of a cubic function is as follows:

$f(x) = ax^3 + bx^2 + cx + d$

The special solution of the cubic equation occurs on the condition that the coefficients have the following finitary relation:

$\frac{b}{a} = \frac{d}{c}$

Thereby it is possible to replace “a“ with a new value

$a = \frac{bc}{d}$

We then express the cubic equation in a factored form by taking out $\frac{bc}{d}$

$$\frac{bc}{d} \cdot \left(x^3 + \frac{d}{c}x^2 + \frac{d}{b}x + \frac{d^2}{bc}\right)$$

Now it is possible to read off the values of "A" and "B or B^2"

$$\frac{d}{c} = A \quad \frac{d}{b} = B^2$$

It results to the following 3 roots:

$$x_1 = -A = -\frac{d}{c} = -\frac{b}{a}$$

$$x_2 = \sqrt{-B^2} = \sqrt{-\frac{d}{b}}$$

$$x_3 = -\sqrt{-B^2} = -\sqrt{-\frac{d}{b}}$$

The Author

My name is Tareq Jami. I am 19 years old and I am from the United Arab Emirates. Currently I live in Glinde, Germany and go to school in Hamburg (Heinrich Hertz Schule).

Origin (history) of the formula

I am currently working on a school project in Mathematics (Analysis). It is about developing a learning app for students for the topic called "Curve Sketching". From there is how I started to develop a mathematical formula. On 22nd of September 2017, I finalized the Jami Formula.

Sources

The Jami Formula is not derived from any of the other common methods and formulas, viz. "Cardano's Formula", "Vieta's substitution" or "Newton's Identities". Hence why it is a new unique formula.

The first and only source to the formula on the internet is on my own private website.

https://thejami.com

After 10 Months of researching, I did not find any other sources to the Jami Formula, that's why I'm trying to publish it on http://arXiv.org.

Further development of the formula

As I already mentioned, in order to make the formula possible to use, the coefficients must have that specific relation. That's why applying this formula is so restricted. Furthermore I decided to continue developing it to find out how it will work on all kinds of cubic equations, so I may be able to make an alternative for the Cardano's Formula.

The Jami Theory

Before I continue, I note that my Formula must be strongly simplified because of the coefficient's relation. So the original formula must be the general formula for all cubic functions.

This is my thesis/theory:

$$x_1 = ? = -\frac{b}{a}$$

$$x_2 = ? = \sqrt{-\frac{d}{b}}$$

$$x_3 = ? = -\sqrt{-\frac{d}{b}}$$

Unfortunately I still didn't manage to find the general formula till now.

Conclusion

Unfortunately I couldn't reach the last step of this formula, but I still believe in my theory, there must be a general formula beyond The Jami Formula. Solving this mystery will lead to bringing a new formula to the world of mathematics (cubic functions) after over 300 years. A formula, which is simpler than Cardano's Formula and more precise than Newton's Method.

This will help the students in schools to learn more about the cubic functions. Also all of the economic students, who work with cost analysis or win/loss functions…etc. will finally be able to solve cubic equations precisely with no struggles.

The last possibility, and what I hope for, is that this will be the first step in making a general formula in solving all kinds of polynomial functions.

The Jami Formula is mathematically proven and completed. (22nd of September 2017)

As I mentioned before, The Jami Formula is a completely new formula, because The Jami Formula is not derived from any of the other common methods and formulas. So the hidden formula is still not yet discovered and it must also be a new unique formula.

Others

Dr. Stefan Heitmann (University of Hamburg) approved that my formula (The Jami Formula) is mathematically correct and that he never saw this formula in any form or in any other sources.

(A screenshot of the email in German is on the last page of this article)

In addition, there is a picture of the first time, where I wrote down the Jami Formula on 22th of September 2017.

The original Article of this was written in German and is already published on:

https://thejami.com

Author's Information

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Hallo Herr Jami,

Ihre spezielle Polynomaufgabe lässt sich schreiben als

0 = a*x^3+b*x^2+c*x^2+d mit a=bc/d

Klammert man den Faktor bc/d aus, entsteht die REDUZIERTE FORM

0 = bc/d*(x^3+d/c*x^2+c/b*x +d^2/(b*c))

Man sieht nach einer Umbenennung der Koeffizienten, z.B.

0 = bc/d*(x^3+A*x^2+B*x+A*B),

dass der hintere Koeffizient A*B das Produkt der beiden vorderen ist, somit also nur noch zwei Koeffizienten im Problem enthalten sind.

Die Nullstellen dieses speziellen Polynoms sind dann, wie Sie geschrieben haben, -A, Wurzel(-B) sowie -Wurzel(-B) .

Ich bestätige Ihnen gerne, dass ich Ihre Lösung noch nie in einer anderen Quelle gesehen habe.
Leider ist es mir (bisher) nicht gelungen, allgemeine kubische Polynome auf den von Ihnen gelösten Fall zu transformieren.

Gruß, Stefan Heitmann

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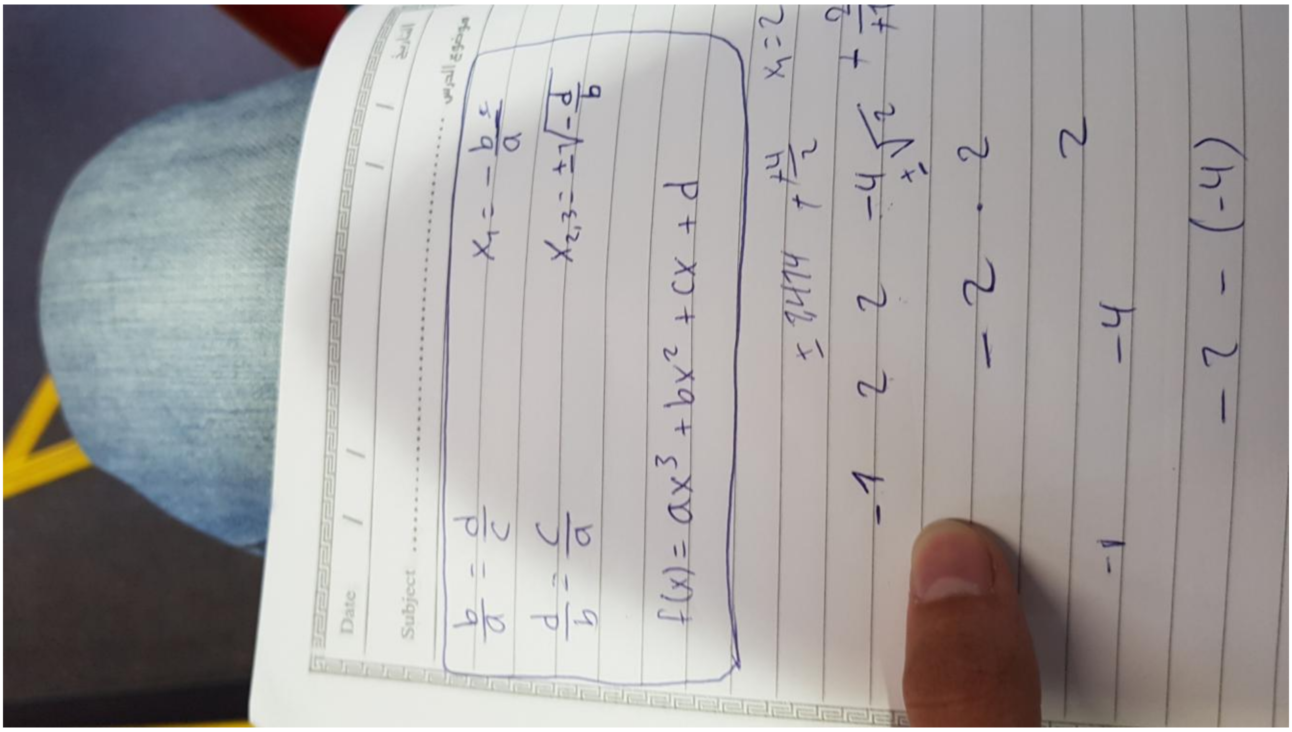
Screenshot of the email from Dr. Stefan Heitmann (Taken on 12th of July 2018)



First time where the Jami Formula was written down on paper by Tareq Jami. (Taken on 22th of September 2017)