Trying to Create Biquadratic Formula

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Abstract: ***In this paper, we are going to see how I rewrote the quartic equation and tried to create a biquadratic formula by using the quadratic formula and as a result of an experiment, let's see what it can do. As the title suggests, that is "Trying to Recreate the Biquadratic Formula", I have tried to create a biquadratic formula in my calculation.***

Keywords: Equation: A mathematical expression/statement with an *equal to* sign. Quartic/Biquadratic Equation: An equation with the highest degree of 4.

Cubic Equation: An equation with the highest degree of 3. Quadratic Equation: An equation with the highest power of 2. Quadratic formula: A formula that is used to find the variable *x* in any quadratic polynomial.

1. Introduction

In this paper, we are going to see how I rewrote the quartic equation and tried to create a [1] biquadratic formula by using the [2] quadratic formula and as a result of an experiment, let's see what it can do. As the title suggests, that is "Trying to Recreate the Biquadratic Formula", I have tried to create a biquadratic formula in my calculation.

We can use the formula in several situations but it was just my *experiment*.

2. Work

$$ax^4 + bx^3 + cx^2 + dx + e = 0$$

$$(ax^4 + bx^3) + (cx^2 + dx + e) = 0$$

$$X^2(ax^2 + bx) + (cx^2 + dx + e) = 0$$

Let f be a real number such that $f = 0$

$$x^2\ (ax^2 + bx + f) + (cx^2 + dx + e) = 0$$

Let's use the quadratic formula

For first calculation variation; Having the constant 0.

$$x^2(a(\frac{-b\pm\sqrt{b^2-4af}}{2a})^2 + b(\frac{-b\pm\sqrt{b^2-4af}}{2a}))+(c(\frac{-d\pm\sqrt{d^2-4ce}}{2c})^2 + d(\frac{-d\pm\sqrt{d^2-4ce}}{2c})+ e) = 0$$

$$x^2(a(\frac{-b\pm\sqrt{b^2-4af}}{2a})^2 + b(\frac{-b\pm\sqrt{b^2-4af}}{2a})\ ) =- \ (c(\frac{-d\pm\sqrt{d^2-4ce}}{2c})^2 + d(\frac{-d\pm\sqrt{d^2-4ce}}{2c}) + e)$$

$$x^2 = \frac{-(c(\frac{-d\pm\sqrt{d^2-4ce}}{2c})^2 + d(\frac{-d\pm\sqrt{d^2-4ce}}{2c})+e)}{a(\frac{-b\pm\sqrt{b^2-4af}}{2a})^2 + b(\frac{-b\pm\sqrt{b^2-4af}}{2a})}$$

$$x = \sqrt{\frac{-(c(\frac{-d\pm\sqrt{d^2-4ce}}{2c})^2 + d(\frac{-d\pm\sqrt{d^2-4ce}}{2c})+e)}{a(\frac{-b\pm\sqrt{b^2-4af}}{2a})^2 + b(\frac{-b\pm\sqrt{b^2-4af}}{2a})}}$$

$$x = \frac{\sqrt{-(c(\frac{-d\pm\sqrt{d^2-4ce}}{2c})^2 + d(\frac{-d\pm\sqrt{d^2-4ce}}{2c})+e)}}{\sqrt{a(\frac{-b\pm\sqrt{b^2-4af}}{2a})^2 + b(\frac{-b\pm\sqrt{b^2-4af}}{2a})}}$$

$$x = \frac{\sqrt{-(c(\frac{-d\pm\sqrt{d^2-4ce}}{2c})^2 + d(\frac{-d\pm\sqrt{d^2-4ce}}{2c})+e)}}{\sqrt{a(\frac{-b\pm b}{2a})^2 + b(\frac{-b\pm b}{2a})}}$$

Let $\frac{-d\pm\sqrt{d^2-4ce}}{2c}$ be $\frac{m}{n}$,

$$x = \frac{\sqrt{-(c(\frac{m}{n})^2 + d(\frac{m}{n})+e)}}{\sqrt{a(\frac{y}{z})^2 + b(\frac{y}{z})}}$$

$$x = \frac{\sqrt{-(\frac{cm^2}{n^2} + \frac{dm}{n}+e)}}{\sqrt{\frac{ay^2}{z^2} + \frac{by}{z}}}$$

$$x = \frac{\sqrt{-1 \times (\frac{cm^2}{n^2} + \frac{dm}{n}+e)}}{\sqrt{\frac{ay^2}{z^2} + \frac{by}{z}}}$$

$$x = \frac{\sqrt{-1} \times \sqrt{(\frac{cm^2}{n^2} + \frac{dm}{n}+e)}}{\sqrt{\frac{ay^2}{z^2} + \frac{by}{z}}}$$

$$x = \frac{\sqrt{-1} \times \sqrt{(\frac{cm^2}{n^2} + \frac{dm}{n}+e)}}{\sqrt{\frac{ay^2}{z^2} + \frac{by}{z}}}$$

$$x = \frac{i\sqrt{\left(\frac{cm^2}{n^2} + \frac{dm}{n} + e\right)}}{\sqrt{\frac{ay^2}{z^2} + \frac{by}{z}}}$$

Now just put the values of *m*, *n*, *y* and *z*.

3. Conclusion

In summary, I have just tried to create the biquadratic formula using quadraticformulas.

References

[1] Lodovico Ferrari is attributed with the discovery of the solution to thequartic in 1540
[2] The quadratic formula was developed during the Islamic Golden Age, attributed to mathematicians such as al-Khwarizmi around the 9th century.

Author Profile

Rishikesh Biswas, a super ordinary 8th grader in India, who has contributed a little to the field of mathematics by doing nothing much by just publishing five research papers (excluding this one) and a book. Besides that, the author plays tabla (Indian Classical Musical Instrument) and has a national scholarship in it from the Ministry of Culture. Author has played chess in nationals as well.