Fundamental Journals
International Journal of Fundamental Physical Sciences (IJFPS)

Original Research Papers
Open Access Journals
ISSN: 2231-8186

IJFPS, Vol 12, No 2, pp 9-18, Jun, 2022
https://doi.org/10.14331/ijfps.2022.330151

The Reality of Imaginary Numbers

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Received April 2022
Received in revised: May 2022
Published: Jun 2022

ABSTRACT

As we know, imaginary numbers are square roots of a negative numbers. In this paper, imaginary numbers will be further defined. Every number has a sign to it. A number can either be a positive or a negative, however zero is neither positive nor negative. The number zero is what can be referred to as a neutral number since it does not have any plus or minus signs. In reality, the sign of zero is neutral which is both positive and negative at the same time $0 = (\pm)0$. The square root of a positive one is both a positive and a negative one $\sqrt{-1} = \pm 1$. In this paper a new view and discussion has been done for different mathematical operators such as addition, subtraction, multiplication and division and some more idea which has never been considered earlier, called Pelletier Postulate.

Keywords: Imaginary numbers - Complex numbers – Neutral – Multiple signs

INTRODUCTION

An imaginary number has been defined as a number that must exist, but it is too difficult to explain and understand. An imaginary number is mostly seen when talking about a square root of a negative number. Mathematicians use the letter i to symbolize the square root of -1 ($i = \sqrt{(-1)}$) and first used by Euler in 1777 as non-real part (Nikouravan, 2019).
Cardano was the first to introduce complex numbers $a + \sqrt{-b}$ into algebra, but had misgivings about it (Merino, 2006). L. Euler (1707-1783) introduced the notation $i = \sqrt{-1}$ (Dunham, 1999), and visualized complex numbers as points with rectangular coordinates, but did not give a satisfactory foundation for complex numbers (Nikouravan, 2019).
In this paper, the imaginary number will be further defined. Every number has a sign to it. A number can either be a positive or a negative, but then there is the number zero which is neither positive nor negative. The number zero is what can be referred to as a neutral number since it has not any plus and minus signs. In reality, the sign of zero is neutral which is both positive and negative at the same time $0 = (\pm)0$. Now with let us look at square roots. The square root of a positive one is both a positive and a negative one $\sqrt{-1} = \pm 1$. It is meaning that $(+1)(+1) = +1$ and $(-1)(-1) = +1$. But the only way to get a negative one is to multiply a positive one by a negative one $-1 = (+1)(-1)$.
But if numbers other than just zero had multiple positive and negative signs, then everything would be easier to understand. As a matter of fact, all numbers do have multiple signs.
Here is where our postulate (Pelletier Postulate) will begin to be explained, and this entire paper will be part of this Postulate. A positive number has essentially two positive signs that give

it an overall positive sign, and a negative number has essentially two negative signs that give it an overall negative sign. Each of the two signs counts as a half a sign so that when the signs are added up, a positive sign and a negative sign will be rendered $+1 = \binom{+}{+}1$ and $-1 = \binom{-}{-}1$.

This now allows us to talk about a number that should be easy to discuss. If there are such thing as positive and negative numbers and zero which is neutral, then there must also be other neutral numbers (briefly seen in absolute values). A neutral number is both positively and negatively signed at the same time. Neutral number = $(\pm)n$ (also $(\mp)n$ is neutral number). As example a neutral one = $(\pm)1$.

A neutral number $|(\pm)n|$ should not be confused with a $\pm n$. For example; ± 5 = +5 and -5 but $|(\pm)5|$= neutral 5. Like the number zero, these numbers are neutral because they have both a positive and a negative sign which cancels each other out resulting in a neutral number. So, nothing changes with positive and negative numbers $\sqrt{+9} = \binom{+}{+}3$ and (-)3, $\sqrt{+9} = +3$ and or -3 and also $\sqrt{-9} = \pm 3$. But now the square root of a negative number can be discussed more $\sqrt{-1} = \pm(\pm)1$, $\sqrt{-1} = +(\pm)1$ and $-(\pm)1$ (a negative outside of parenthesis still changes the signs inside the parenthesis). $\sqrt{-1} = (\pm)1$ and $(\mp)1$. Meaning: $(\pm)1 \times (\pm)1 = -1$ and $(\mp)1 \times (\mp)1 = -1$. So, if $\sqrt{-1} = i$, then $i = (\pm)1$ and $-i = -(\pm)1$ and $-i = (\mp)1$. Therefore, $\sqrt{-1} = \pm i$ and $i^2 = -1$ and also $-(i)^2 = 1$.

BASIC MATH REDEFINED

Now we have defined i as a real number and not as an imaginary number, we will go over basic math operations using the neutral number. This section will be using mostly equations and some words for explanation which will hopefully make everything easier to understand instead of just using words.

MULTIPLICATION

Accordingly, $\binom{+}{+}9 \times \binom{+}{+}9$ reduces to (equals) $(+9)(+9) = (+81) = \binom{+}{+}81$ and $\binom{-}{-}9 \times \binom{-}{-}9$ reduces to (equals) $(-9)(-9) = (+81) = \binom{+}{+}81$ and $\binom{+}{+}9 \times \binom{-}{-}9$ reduces to (equals) $(+9)(-9) = (-81) = \binom{-}{-}81$.

Also, we have the same for the below:

$$(\pm)9 \times (\pm)9 = (9i) \times (9i) = 81i^2 = (-81) = \binom{-}{-}81$$

$$(\mp)9 \times (\mp)9 = (-9i) \times (-9i) = (-9i) \times (-9i) = (81i^2)$$
$$= -81 = \binom{-}{-}81$$

$$\binom{+}{+}9 \times (\pm)9 = (9i) \times (9i) = +81i = (\pm)81$$

$$\binom{+}{+}9 \times (\mp)9 = +9 \times -9i = -81i = -(\pm)81 = (\mp)81$$

$$\binom{-}{-}9 \times (\pm)9 = -9 \times 9i = -81\mathrm{i} = -(\pm)81 = (\mp)81$$

$$\binom{-}{-}9 \times (\mp)9 = -9 \times -9i = +81i = (\pm)81$$

$$(\pm)9 \times (\mp)9 = 9i \times -9i = -81i^2 = -81 \times -1 = +81 = \binom{+}{+}81$$

SUMMARY FOR MULTIPLICATION

Positively and negatively signed numbers multiplied by the same sign equals a positive number as $(+) \times (+) = (+)$ and $(-) \times (-) = (+)$. But the neutral numbers multiplied by the same neutral equals a negative number as $(\pm) \times (\pm) = (-)$ and $(\mp) \times (\mp) = (-)$.

Positively and negatively signed numbers multiplied by oppositely signed numbers equals a negative number $(+) \times (-) = (-)$ and $(-) \times (+) = (-)$. Whereas the neutral numbers multiplied by opposite neutrals equals a positive number.

$$(\pm) \times (\mp) = (+) \text{ and } (\mp) \times (\pm) = (+).$$

A positive number multiplied by a neutral is that neutral because a positive sign multiplied by a zero sign must be that zero sign just like when any number is multiplied by a zero and equals a zero $(+) \times (\pm) = (+)$ and $(+) \times (\mp) = (\mp)$.

The same process for a negative number multiplied by a neutral is the opposite neutral $(-) \times (\pm) = (\mp)$ and $(-) \times (\mp) = (\pm)$.

In general, with any number (positive, negative, or neutral) multiplied by any non-neutral number, the product is assigned a sign in the following way – the product of both top signs over the product of both bottom signs.

$$\binom{+}{+} \times (\mp) = \binom{(+) \times (-)}{(+) \times (+)} = (\mp)$$

But with any neutral number multiplied by any neutral number, the product is assigned a sign in the following way – the product of the top of one sign and the bottom of the other sign over the product of the bottom of one sign and the top of the other sign.

$$(\pm) \times (\mp) = \binom{(+) \times (+)}{(-) \times (-)} = \binom{+}{+} = +$$

$$(\pm) \times (\pm) = \binom{(+) \times (-)}{(-) \times (+)} = \binom{-}{-} = -$$

DIVISION

For division also we may have,

$$\frac{\binom{+}{+}9}{\binom{+}{+}9} = \frac{+9}{+9} = +1 \quad , \quad \frac{\binom{-}{-}9}{\binom{-}{-}9} = \frac{-9}{-9} = +1$$

$$\frac{\binom{+}{+}9}{\binom{-}{-}9} = \frac{+9}{-9} = -1 \quad , \quad \frac{\binom{-}{-}9}{\binom{+}{+}9} = \frac{-9}{+9} = -1$$

$$\frac{(\pm)9}{(\pm)9} = \frac{9i}{9i} = +1, \quad \frac{(\mp)9}{(\mp)9} = \frac{-9i}{-9i} = +1$$

$$\frac{\binom{+}{+}9}{(\pm)9} = \frac{+9}{(\pm)9} = \frac{1}{(\pm)1} = (\pm)1 \; \frac{(\pm)9}{\binom{+}{+}9} = \frac{9i}{9} = i = (\pm)1$$

$$\frac{\binom{+}{+}9}{(\mp)9} = \frac{+9}{(\mp)9} = \frac{1}{(\mp)1} = (\mp)1 \; \frac{(\mp)9}{\binom{+}{+}9} = \frac{-9i}{+9} = -i = (\mp)1$$

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$\frac{\binom{-}{-}9}{(\pm)9} = \frac{-9}{(\pm)9} = \frac{-1}{(\pm)1} = -(\pm)1 = (\mp)1 \quad \frac{(\pm)9}{\binom{-}{-}9} = \frac{9i}{-9} = -i = (\mp)1$

$\frac{\binom{-}{-}9}{(\mp)9} = \frac{-9}{(\mp)9} = \frac{-1}{(\mp)1} = -(\mp)1 = (\pm)1 \quad \frac{(\mp)9}{\binom{-}{-}9} = \frac{-9i}{-9} = i = (\pm)1$

$\frac{(\pm)9}{(\mp)9} = \frac{9i}{-9i} = \frac{1}{-1} = -1 \quad \frac{(\mp)9}{(\pm)9} = \frac{-9i}{9i} = \frac{-1}{1} = -1$

SUMMARY FOR DIVISION

Positively and negatively signed numbers divided by the same sign equals a positive number $\frac{(+)}{(+)} = +$ and $\frac{(-)}{(-)} = +$. Similarly, neutral numbers divided by the same neutral equals a positive number, $\frac{(\pm)}{(\pm)} = (+)$ and $\frac{(\mp)}{(\mp)} = (+)$. Positively and negatively signed numbers divided by oppositely signed numbers equals a negative number $\frac{(+)}{(-)} = (-)$ and $\frac{(-)}{(+)} = (-)$.

Also, neutral numbers divided by opposite neutrals equals a negative number, $\frac{(\pm)}{(\mp)} = (-)$ and $\frac{(\mp)}{(\pm)} = (-)$. A positive and a neutral number in a division problem result in that neutral $\frac{(+)}{(\pm)} = (\pm)$ and $\frac{(\pm)}{(+)} = (\pm)$.

Similarly, we have $\frac{(+)}{(\mp)} = (\mp)$ and $\frac{(\mp)}{(+)} = (\mp)$. A negative and a neutral number in a division problem result in the opposite neutral as: $\frac{(-)}{(\pm)} = (\mp)$, $\frac{(\pm)}{(-)} = (\mp)$, $\frac{(-)}{(\mp)} = (\pm)$ and finally $\frac{(\mp)}{(-)} = (\pm)$. In general, with any number (positive, negative, or neutral) divided by any number (positive, negative, or neutral), the quotient is assigned a sign in the following way – the sign of the numerator is multiplied by the sign of the denominator in the way that has the product of both top signs over the product of both bottom signs.

$$\frac{\binom{-}{-}}{(\pm)} = \binom{-}{-} \times (\pm) = \binom{- \times +}{- \times -} = (\mp)$$

$$\frac{(\mp)}{(\mp)} = (\mp) \times (\mp) = \binom{- \times -}{+ \times +} = \binom{+}{+} = +$$

ADDITION AND SUBTRACTION

Addition and subtraction are still the same with positively and negatively signed numbers. The same rules also apply to neutral numbers – perform the function and assign the result the sign of the larger number. To help figure these out, focus on the overall sign. Even though these signs are neutral, they either have an overall positive or negative aspect to them which is seen as the top sign of every sign.

If a number is a positive in any way (positive neutral or partial positive), then treat it like a positive, and if a number is negative in any way (negative neutral or partial negative), then treat it like a negative. Look at the top signs, perform the function, and ignoring the sign of the outcome, assign the full sign of the number that has the largest sign.

If two numbers have the same size sign but different signs, assign the number the sign of the largest number (this is the rule that has been followed with adding positive and negative numbers – now it is incorporated the same way in all adding and subtracting). Examples are as:

$$4 + 3i = \binom{+}{+}4 + (\pm)3 = \binom{+}{+}7 = 7 \to (+4) + (+3) = (+7) = 7$$
$$4 - 3i = \binom{+}{+}4 - (\pm)3 = \binom{+}{+}1 = 1 \to (+4) - (+3) = (+1) = 1$$
$$= \binom{+}{+}4 + (\mp)3 = \binom{+}{+}1 = 1 \to (+4) + (-3) = (+1) = 1$$
$$-4 + 3i = \binom{-}{-}4 + (\pm)3 = \binom{-}{-}1 = -1 \to (-4) + (+3) = (-1)$$
$$-4 - 3i = \binom{-}{-}4 - (\pm)3 = \binom{-}{-}7 = -7 \to (-4) - (+3) = (-7)$$
$$= \binom{-}{-}4 + (\mp)3 = \binom{-}{-}7 = -7 \to (-4) + (-3) = (-7)$$
$$2 + 3i = \binom{+}{+}2 + (\pm)3 = \binom{+}{+}5 = +5 \to (+2) + (+3) = (+5)$$

The 2 has a $(+1)$ sign, and the 3 has a 0 sign. The result will have the sign of the larger sign, so the result has a $(+1)$ sign, and the result is $(+5)$.

$$2 - 3i = \binom{+}{+}2 - (\pm)3 = \binom{+}{+}1 = +1 \to +2 - +3 = -1$$
$$= \binom{+}{+}2 + (\mp)3 = \binom{+}{+}1 = +1 \to +2 + -3 = -1$$

The result of performing the functions focusing on the tops of each sign is a -1. So, ignore the negative sign there and assign the 1 the sign of the larger sign which in this case is $\binom{+}{+}1$. So $\binom{+}{+}1 = +1$.

$$-2 + 3i = \binom{-}{-}2 + (\pm)3 = \binom{-}{-}1 = -1 \to -2 + +3 = +1$$

The result of performing the functions focusing on the tops of each sign is a +1. Consequently, ignore the Positive sign there and assign the 1 the sign of the larger sign which in this case is $\binom{-}{-}1$. So $\binom{-}{-}1 = -1$

$$-2 - 3i = \binom{-}{-}2 - (\pm)3 = \binom{-}{-}5 = -5 \to -2 - +3 = -5$$
$$= \binom{-}{-}2 + (\mp)3 = \binom{-}{-}5 = -5 \to -2 + -3 = -5$$

The result of performing the functions focusing on the tops of each sign is a -5. Thus, ignore the negative sign there and assign the 5 the sign of the larger sign which in this case is $\binom{-}{-}1$. So $\binom{-}{-}5 = -5$.

A signed number and the same neutral number combined results in the combined numeral with the same sign as the signed number. Just like the nucleus of an atom will have a combined mass of the protons plus the neutrons, but the overall sign is that of the protons.

$$1 + i = \binom{+}{+}1 + (\pm)1 = \binom{+}{+}2 = +2$$
$$1 - i = \binom{+}{+}1 - (\pm)1 = 0$$
$$1 \pm i = \binom{+}{+}1 + (\mp)1 = 0$$
$$1 - -i = \binom{+}{+}1 - (\mp)1 = \binom{+}{+}2 = +2$$
$$-1 + i = \binom{-}{-}1 + (\pm)1 = 0$$

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https://doi.org/10.14331/ijfps.2022.330151

$$-1 - i = \binom{-}{-}1 - (\pm)1 = \binom{-}{-}2 = -2$$
$$-1 \pm i = \binom{-}{-}1 + (\mp)1 = \binom{-}{-}2 = -2$$
$$-1 - -i = \binom{-}{-}1 - (\mp)1 = 0$$

(In all reality, all of the examples that equal zero are all $(\pm)0$ and not a $\binom{+}{+}0$ or a $\binom{-}{-}0$ because the result of performing the functions of the tops of each sign is 0 which means that it has a sign of $(\pm)$ no matter what because that is the definition of a 0.)

$\binom{+}{+}1 + (\pm)1 = \binom{+}{+}2 = +2$ $\quad$ $\binom{+}{+}1 + \binom{+}{+}1 = \binom{+}{+}2 = +2$

$$+2 = +2$$
$$\binom{+}{+}1 + (\pm)1 = \binom{+}{+}1 + \binom{+}{+}1$$
$$-\binom{+}{+}1 \qquad -\binom{+}{+}1$$

$$(\pm)1 = \binom{+}{+}1$$
$$(\pm)1 = +1$$
$$i = 1$$

and

$\binom{-}{-}1 + (\mp)1 = \binom{-}{-}2 = -2$ $\quad$ $\binom{-}{-}1 + \binom{-}{-}1 = \binom{-}{-}2 = -2$

$$-2 = -2$$
$$\binom{-}{-}1 + (\mp)1 = \binom{-}{-}1 + \binom{-}{-}1$$
$$-\binom{-}{-}1 \qquad -\binom{-}{-}1$$

$$(\mp)1 = \binom{-}{-}1$$
$$(\mp)1 = -1$$
$$-i = -1$$
$$i = 1$$

The individual numbers should not be exactly equal to each other, but rather the set of numbers combined are what really equal each other. Regardless of that statement though, a person can argue that the two individual numbers are equal, and they do equal each other in the way that they have the same numeric value.

The positive i or "positive neutral" or (±)1 equals the $\binom{+}{+}1$ because of the positive tendencies they both have. They are not exactly equal, but they share the same numeral and possess enough of the same tendencies (especially in this scenario) where it can be said in cases like this where $\binom{+}{+}1$= (±)1 and $\binom{-}{-}1 = (\mp)1$.

This in no way allows for i or (±)1 to be substituted for $\binom{+}{+}1$, nor –i or $(\mp)1$ to be substituted for $\binom{-}{-}1$. Also, this is not a way in which to "disprove" math. Just like the following does not "disprove" math even though it is as interesting as the previous discovery.

3 + 4 = x, x only equals +7

but

3 + 4 = x -3 -3

---

4 = x – 3 square both sides

$4^2 = (x-3)^2$
16 = $x^2 - 6x + 9$
-16 -16

$0 = x^2 - 6x - 7$ factor

$(x-7) \times (x+1) = 0$
x – 7 = 0 and x + 1 = 0
x = 7 x = -1

x equals both +7 and -1. (the same conclusion can be found using the quadratic formula: $x = \frac{-b \pm \sqrt{b^2-4ac}}{2a}$).
But the x only equals +7 regardless of this. These are two types of anomalies that occur in math, but both must be understood so that the correct answers and procedures may be honored. These topics should be clearly defined now so that no more questions need to be asked, and we can conclude discussion on these topics.

EXPONENTS

Numbers with a neutral exponent will be handled in the following ways. Again, focus on the top of the signs.

$$3^{+2} = 3^{\binom{+}{+}2} = \binom{+}{+}[3 \cdot 3] = \binom{+}{+}9 = +9$$
$$3^{2i} = 3^{(\pm)2} = (\pm)[3 \cdot 3] = (\pm)9 = 9i$$

(Treat this as if it were a 3^{+2}, just put the i or $(\pm)$ in front of the number at the end)

$$3^{\binom{-}{-}2} = \frac{1}{3^{\binom{+}{+}2}} = \binom{+}{+}\frac{1}{9} = \frac{1}{9}$$
$$3^{(\mp)2} = \frac{1}{3^{(\pm)2}} = (\pm)\frac{1}{9} = \frac{i}{9}$$

(Always invert $a - i$ first like a negative number and change its sign before you perform the function)

$$(-3)^{\binom{+}{+}2} = \binom{+}{+}[-3 \times -3] = \binom{+}{+} + 9 = \binom{+}{+}9 = +9$$

$$(-3)^{\binom{-}{-}2} = \frac{1}{(-3)^{\binom{+}{+}2}} = \binom{+}{+}\frac{1}{(-3)^2} = \binom{+}{+}\frac{1}{9} = +\frac{1}{9}$$

$$(-3)^{(\pm)2} = (\pm)[-3 \times -3] = (\pm) + 9 = (\pm)9 = 9i$$

$$(-3)^{(\mp)2} = \frac{1}{(-3)^{(\pm)2}} = (\pm)\frac{1}{(-3)^2} = (\pm)\frac{1}{9} = \frac{i}{9}$$

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https://doi.org/10.14331/ijfps.2022.330151

$$[(\pm)3]^{\binom{+}{+}2} = \binom{+}{+}(\pm)3\times(\pm)3 = \binom{+}{+}-9 = \binom{-}{-}9 = -9$$

$$[(\pm)3]^{\binom{-}{-}2} = \frac{1}{[(\pm)3]^{\binom{+}{+}2}} = \binom{+}{+}\frac{1}{[(\pm)3]^2} = \binom{+}{+}\frac{1}{-9} = \binom{-}{-}\frac{1}{9} = -\frac{1}{9}$$

$$[(\mp)3]^{\binom{+}{+}2} = \binom{+}{+}(\mp)3\times(\mp)3 = \binom{+}{+}-9 = \binom{-}{-}9 = -9$$

$$[(\mp)3]^{\binom{-}{-}2} = \frac{1}{[(\mp)3]^{\binom{+}{+}2}} = \binom{+}{+}\frac{1}{[(\mp)3]^2} = \binom{+}{+}\frac{1}{-9} = \binom{-}{-}\frac{1}{9} = -\frac{1}{9}$$

$$[(\pm)3]^{(\pm)2} = (\pm)[(\pm)3\times(\pm)3] = (\pm)-9 = (\mp)9 = -9i$$

$$[(\pm)3]^{(\mp)2} = \frac{1}{[(\pm)3]^{(\pm)2}} = (\pm)\frac{1}{[(\pm)3]^2} = (\pm)\frac{1}{-9} = (\mp)\frac{1}{9} = -\frac{i}{9}$$

$$[(\mp)3]^{(\pm)2} = (\pm)[(\mp)3\times(\mp)3] = (\pm)-9 = (\mp)9 = -9i$$

$$[(\mp)3]^{(\mp)2} = \frac{1}{[(\mp)3]^{(\pm)2}} = (\pm)\frac{1}{[(\mp)3]^2} = (\pm)\frac{1}{-9} = (\mp)\frac{1}{9} = -\frac{i}{9}$$

$$3^{\binom{+}{+}3} = \binom{+}{+}3^3 = \binom{+}{+}27 = +27$$

$$3^{\binom{-}{-}3} = \frac{1}{3^{\binom{+}{+}3}} = \binom{+}{+}\frac{1}{27} = +\frac{1}{27}$$

$$(-3)^{\binom{+}{+}3} = \binom{+}{+}(-3)^3 = \binom{+}{+}-27 = \binom{-}{-}27 = -27$$

$$(-3)^{\binom{-}{-}3} = \frac{1}{(-3)^{\binom{+}{+}3}} = \binom{+}{+}\frac{1}{-27} = \binom{-}{-}\frac{1}{27} = -\frac{1}{27}$$

$$3^{(\pm)3} = (\pm)[3^3] = (\pm)27 = 27i$$

$$3^{(\mp)3} = \frac{1}{3^{(\pm)3}} = (\pm)\frac{1}{3^3} = (\pm)\frac{1}{27} = \frac{i}{27}$$

$$(-3)^{(\pm)3} = (\pm)[(-3)^3] = (\pm)-27 = (\mp)27 = -27i$$

$$(-3)^{(\mp)3} = \frac{1}{(-3)^{(\pm)3}} = (\pm)\frac{1}{(-3)^3} = (\pm)\frac{1}{-27} = (\mp)\frac{1}{27} = -\frac{i}{27}$$

$$[(\pm)3]^{\binom{+}{+}3} = \binom{+}{+}[(\pm)3]^3 = \binom{+}{+}(\mp)27 = (\mp)27 = -27i$$

$$[(\pm)3]^{\binom{-}{-}3} = \frac{1}{[(\pm)3]^{\binom{+}{+}3}} = \binom{+}{+}\frac{1}{[(\pm)3]^3} = \binom{+}{+}\frac{1}{(\mp)27} = (\mp)\frac{1}{27} = -\frac{i}{27}$$

$$[(\mp)3]^{\binom{+}{+}3} = \binom{+}{+}[(\mp)3]^3 = \binom{+}{+}(\pm)27 = (\pm)27 = 27i$$

$$[(\mp)3]^{\binom{-}{-}3} = \frac{1}{[(\mp)3]^{\binom{+}{+}3}} = \binom{+}{+}\frac{1}{[(\mp)3]^3} = \binom{+}{+}\frac{1}{(\pm)27} = (\pm)\frac{1}{27} = \frac{i}{27}$$

$$[(\pm)3]^{(\pm)3} = (\pm)[(\pm)3]^3 = (\pm)(\mp)27 = \binom{+}{+}27 = +27$$

$$[(\pm)3]^{(\mp)3} = \frac{1}{[(\pm)3]^{(\pm)3}} = (\pm)\frac{1}{[(\pm)3]^3} = (\pm)\frac{1}{(\mp)27} = \binom{+}{+}\frac{1}{27} = +\frac{1}{27}$$

$$[(\mp)3]^{(\pm)3} = (\pm)[(\mp)3]^3 = (\pm)(\pm)27 = \binom{-}{-}27 = -27$$

$$[(\mp)3]^{(\mp)3} = \frac{1}{[(\mp)3]^{(\pm)3}} = (\pm)\frac{1}{[(\mp)3]^3} = (\pm)\frac{1}{(\pm)27} = \binom{-}{-}\frac{1}{27} = -\frac{1}{27}$$

SUMMARY FOR EXPONENTS

Make sure the sign of the exponent has a positive as the top part of the sign (or an overall positive aspect). If it does not, then change the number to its reciprocal to make its exponent have a positive as the top part of the sign (or an overall positive aspect). Then take the sign of the exponent and put it in front of the number after performing the function.

NUMBER-LINES AND GRAPHS

Since an "imaginary" number is just a neutral number, each of the x, y, and z-axis will have a corresponding xi, yi, and zi-axis. A number-line with just "imaginary" numbers is simple:

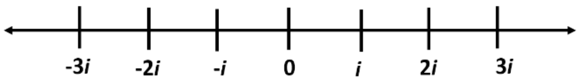

Fig 1.

But the x-axis with its corresponding xi-axis will look like this:

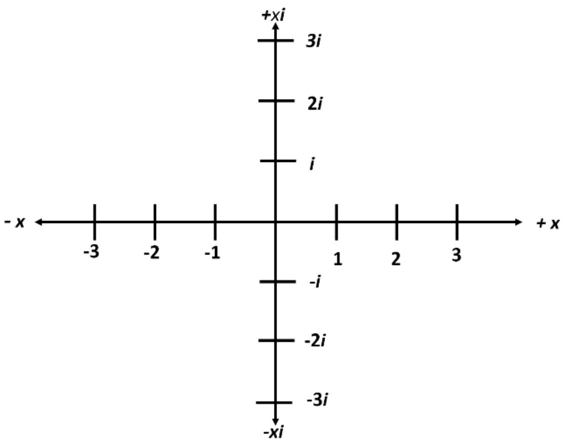

Fig 2.

The xi-axis is on the plane of the x-axis where it is neutral (at zero) – neither positive nor negative. The same applies for the y-axis and yi-axis and the z-axis and zi-axis. Showing a x, y,

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https://doi.org/10.14331/ijfps.2022.330151

and z graph with their corresponding xi, yi, and zi is very difficult to show on paper.

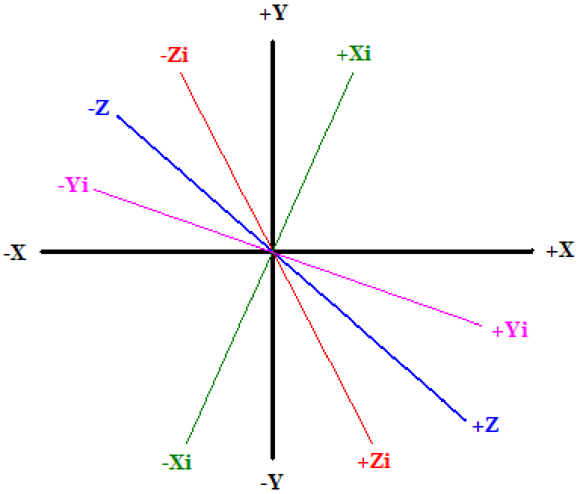

Fig 3.

The xi-axis is perpendicular to the x-axis and 45º from both the y-axis and the z-axis. The yi-axis is perpendicular to the y-axis and 45º from both the x-axis and the z-axis. The zi-axis is perpendicular to the z-axis and 45º from both the x-axis and the y-axis. The xi, yi, and zi-axis are all perpendicular to each other just like the x, y, and z-axis are perpendicular to each other.

A NUMBER DIVIDED BY A ZERO

Any number divided by a zero has always been considered an error, non-calculable, or impossible. But this idea will not last for much longer. Before getting into this topic right away, I will premise it by talking about zero divided by any number. First of all, zero divided by any number reduces to zero divided by one. And then zero divided by one equal zero.

$$\frac{0}{5} = \frac{1}{1} \cdot \frac{0}{5} = \frac{\left(\frac{1}{5}\right)}{\left(\frac{1}{5}\right)} \times \frac{0}{5} = \frac{\left(\frac{1}{5} \cdot 0\right)}{\left(\frac{1}{5} \cdot 5\right)} = \frac{0}{1} = 0$$

A zero is always a $(\pm)0$ or a $(\mp)0$ just by definition of a zero. A zero is nothing, and nothing must have no sign ever.

$$+0 = +(\pm)0 = (\pm)0$$

$$-0 = -(\pm)0 = (\mp)0$$

$$\frac{1}{+\infty} = +0 = +(\pm)0 = (\pm)0$$

$$\frac{1}{-\infty} = -0 = -(\pm)0 = (\mp)0$$

$$\frac{1}{(\pm)\infty} = (\pm)0 \qquad \frac{1}{(\mp)\infty} = (\mp)0$$

Zero divided into however many parts is still going to be zero. Even an easier way to see that being true is to look at a graph.

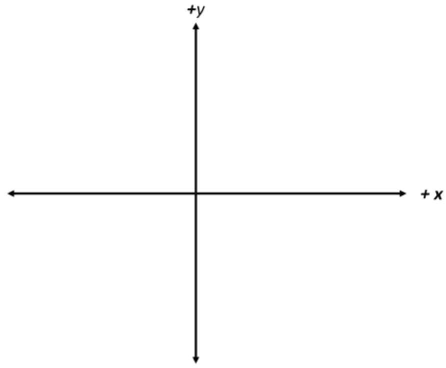

Fig 4.

Looking at the x-axis and thinking about slope, it is obvious to see that it is flat. Because it is flat and horizontal, it must have no slope at all, or it has a slope of zero. This is what we have always learned, and the reason for it is that slope (m) equals rise over run.

$$slope = m = \frac{rise}{run} = \frac{\Delta y}{\Delta x} = \frac{y_2 - y_1}{x_2 - x_1}$$

For the slope of the x-axis, there is no rise (no change in the y-direction), so rise equals zero. The run (change in the x-direction) can equal almost any number. Consequently, the slope of the x-axis equals zero. $m = \frac{0}{n} = 0$. Now let us look at other slopes to see this proved even further.

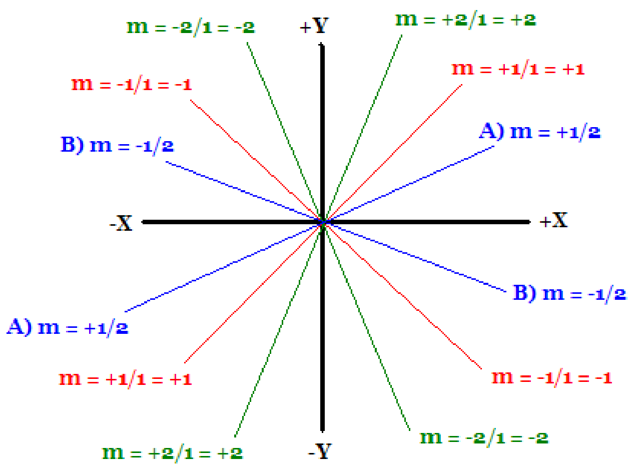

Fig 5.

As line A becomes flatter and more like the x-axis, the slope approaches the positive side of zero. Also, as line B becomes flatter and more like the x-axis, the slope approaches the negative side of zero. Therefore, the x-axis must have a slope of $(\pm)0$. And the negative side of the x-axis has a slope that equals $(\mp)0$.

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$$\frac{(\pm)0}{\binom{+}{+}1} = (\pm)\frac{0}{1} = (\pm)0$$

$$\frac{(\pm)0}{\binom{-}{-}1} = (\mp)\frac{0}{1} = (\mp)0$$

$$= \left(\frac{-1}{-1}\right)\left(\frac{(\pm)0}{\binom{-}{-}1}\right) = \frac{(\mp)0}{\binom{+}{+}1} = (\mp)\frac{0}{1} = (\mp)0$$

Now we will focus on the y-axis. The slope of the y-axis is any number divided by zero which reduces to one divided by zero.

$$\frac{5}{0} = \left(\frac{1}{1}\right)\left(\frac{5}{0}\right) = \left(\frac{\left(\frac{1}{5}\right)}{\left(\frac{1}{5}\right)}\right)\left(\frac{5}{0}\right) = \frac{\left(\frac{1}{5}\cdot 5\right)}{\left(\frac{1}{5}\cdot 0\right)} = \frac{1}{0} = ?$$

As the line C in the following figure straightens up to look more like the y-axis, the slope approaches positive infinity (∞). Also, as the line D in the following figure straightens up to look more like the y-axis, the slope approaches negative infinity (-∞). And having this in correlation with the precedents of the x-axis and that slope, the slope of the y-axis must be equal to $(\pm)\infty$.

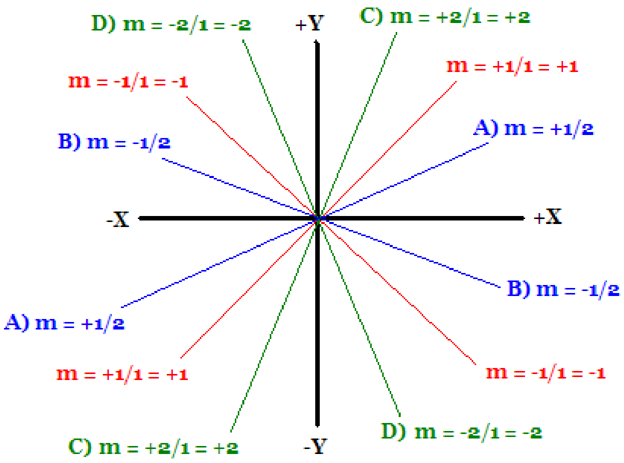
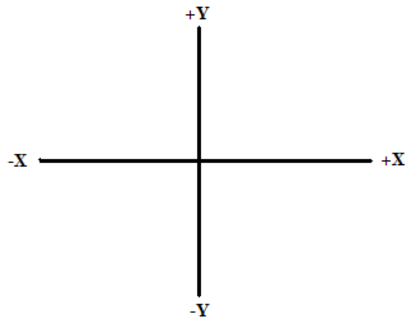


Fig 6.

The fact that $\frac{1}{0} = \pm\infty$ also agrees with all the past rules stated in this book. A positive number divided by a neutral number results in that neutral number, so one divided by zero must equal a neutral number.

Since one divided by an incredibly small number approaches infinity, one divided by zero must be infinity. Putting these two observations together results in the discovery of a number divided by zero equals neutral infinity. And the negative side of the y-axis has a slope that is equal to $(\mp)\infty$.

$$m = \frac{1}{0} = (\pm)\infty$$



$$m = -\frac{1}{0} = (\mp)\infty$$

Fig 7.

$$\frac{1}{0} = \frac{\binom{+}{+}1}{(\pm)0} = (\pm)\frac{1}{0} = (\pm)\infty$$

$$\frac{-1}{0} = \frac{\binom{-}{-}1}{(\pm)0} = (\mp)\frac{1}{0} = (\mp)\infty$$

$$= \left(\frac{-1}{-1}\right)\cdot\left(\frac{\binom{-}{-}1}{(\pm)0}\right) = \frac{\binom{+}{+}1}{(\mp)0} = (\mp)\frac{1}{0} = (\mp)\infty$$

MORE ON MULTIPLE SIGNS OF NUMBERS

We looked at how numbers have two signs, and we did some work with the squares of i and $-i$. But now we will look at the square root of i. The only way of finding that is if the signs of numbers can break down even further. The fact of the matter is that every sign is made up of two signs, and each of those two signs is made up of another two signs and on and on it goes.

$$+1 = \binom{+}{+}1 = \left(\begin{matrix}\binom{+}{+}\\ \binom{+}{+}\end{matrix}\right)1 \quad , \quad (\pm)1 = \left(\begin{matrix}\binom{+}{+}\\ \binom{-}{-}\end{matrix}\right)1$$

Understanding this concept then leads to a myriad of combinations of signs.

$$\binom{+}{i}1 = \left(\begin{matrix}\binom{+}{+}\\ \binom{+}{-}\end{matrix}\right)1$$

Every principal and rule that was introduced in this book still holds true with this new concept.

MULTIPLICATION

In general, with any number (positive, negative, or neutral) multiplied by any non-neutral number, the product is assigned a sign in the following way – the product of both top signs over the product of both bottom signs.

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https://doi.org/10.14331/ijfps.2022.330151

$$\binom{+}{+} \cdot (\mp) = \binom{+\cdot -}{+\cdot +} = (\mp)$$

But with any neutral number multiplied by any neutral number, the product is assigned a sign in the following way – the product of the top of one sign and the bottom of the other sign over the product of the bottom of one sign and the top of the other sign.

$$(\pm) \cdot (\mp) = \binom{+\cdot +}{-\cdot -} = \binom{+}{+} = +$$

$$(\pm) \cdot (\pm) = \binom{+\cdot -}{-\cdot +} = \binom{-}{-} = -$$

$$\left[\binom{+}{i} 1\right]^2 = \binom{+}{i} 1 \cdot \binom{+}{i} 1 = \begin{pmatrix} \binom{+}{+} \\ \binom{+}{-} \end{pmatrix} 1 \cdot \begin{pmatrix} \binom{+}{+} \\ \binom{+}{-} \end{pmatrix} 1 = \begin{pmatrix} \binom{+\cdot +}{+\cdot +} \\ \binom{+\cdot -}{-\cdot +} \end{pmatrix} 1$$
$$= \begin{pmatrix} \binom{+}{+} \\ \binom{-}{-} \end{pmatrix} 1 = (\pm)1 = i$$

DIVISION

In general, with any number (positive, negative, or neutral) divided by any number (positive, negative, or neutral), the quotient is assigned a sign in the following way – the sign of the numerator is multiplied by the sign of the denominator in the way that has the product of both top signs over the product of both bottom signs.

$$\frac{\binom{-}{-}}{(\pm)} = \binom{-}{-} \cdot (\pm) = \binom{-\cdot +}{-\cdot -} = (\mp)$$

$$\frac{(\mp)}{(\mp)} = (\mp) \cdot (\mp) = \binom{-\cdot -}{+\cdot +} = \binom{+}{+} = +$$

$$\frac{\binom{+}{i}}{\binom{+}{i}} = \binom{+}{i} \cdot \binom{+}{i} = \begin{pmatrix} \binom{+}{+} \\ \binom{+}{-} \end{pmatrix} \cdot \begin{pmatrix} \binom{+}{+} \\ \binom{+}{-} \end{pmatrix} = \begin{pmatrix} \binom{+\cdot +}{+\cdot +} \\ \binom{+\cdot +}{-\cdot -} \end{pmatrix} = \begin{pmatrix} \binom{+}{+} \\ \binom{+}{+} \end{pmatrix}$$
$$= \binom{+}{+} = +$$

ADDITION AND SUBTRACTION

With addition and subtraction, you also follow the same rules. If a number is a positive in any way (positive neutral or partial positive), then treat it like a positive, and if a number is negative in any way (negative neutral or partial negative), then treat it like a negative. Look at the overall signs, perform the function, and ignoring the sign of the outcome, assign the full sign of the number that has the largest sign.
If two numbers have the same size sign but different signs, assign the number the sign of the largest number (this is the rule that has been followed with adding positive and negative numbers – now it is incorporated the same way in all adding and subtracting).

EXPONENTS

Make sure the sign of the exponent has a positive as the top part of the sign (or an overall positive aspect). If it does not, then change the number to its reciprocal to make its exponent have a positive as the top part of the sign (or an overall positive aspect). Then take the sign of the exponent and put it in front of the number after performing the function. The breakdown of signs really has no limits. The following is a table (Table 1) of just some of the combinations of signs and the corresponding squares.

Table 1. Some of the combinations of signs and the corresponding squares

X	X^2	
1	$\binom{+}{+}1 = +1$	+1
2	$\binom{-}{-}1 = -1$	+1
3	$(\pm)1 = i$	-1
4	$(\mp) = -i$	-1
5	$\binom{+}{i}1$	i
6	$\binom{i}{+}1$	$-i$
7	$\binom{i}{-}1$	$-i$
8	$\binom{-}{i}1$	i
9	$\binom{+}{-i}1$	i
10	$\binom{-i}{+}1$	$-i$
11	$\binom{-}{-i}1$	i
12	$\binom{-i}{-}1$	$-i$
13	$\binom{i}{-i}1$	-1
14	$\binom{-i}{i}1$	-1
15	$\binom{i}{i}1$	-1
16	$\binom{-i}{-i}1$	-1

The square roots of i and $-i$ are now solved. The conclusion can be said that if you were to take the fourth root of i, further break- down and multiple signs must be introduced.
And this break- down of signs means that there are infinite possibilities where every sign is made up of a pair of other signs. Even though roots of neutral numbers are not needed very often at all, at least they can be understood. Our focus will now be on the overall signs of numbers.

$$\binom{+}{i}1 = \begin{pmatrix} \binom{+}{+} \\ \binom{+}{-} \end{pmatrix} 1 \text{ overall sign} = +\frac{1}{2}$$

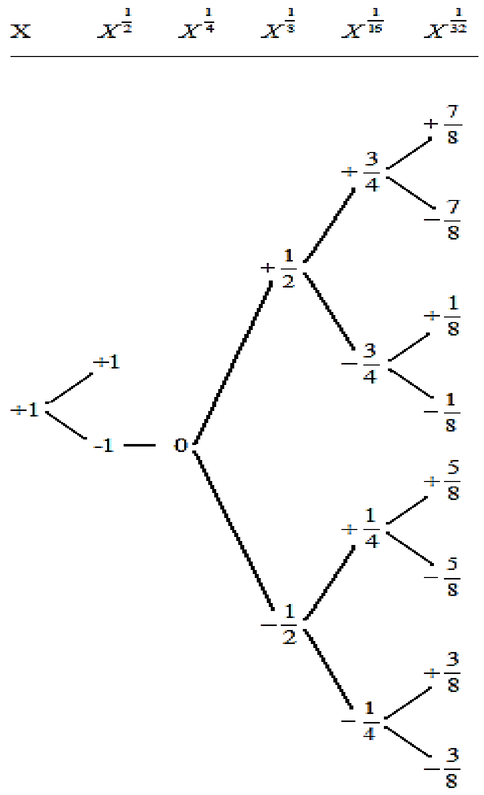
The following is a table of overall signs of numbers and the overall signs of square roots. This table of 1 – 16 signs correspond to the numbers 1 – 16 in Table 1.

Now let us look specifically at just the signs of numbers and not the numbers themselves. The following table shows the square roots of the numbers to the left.

Table 2

X	$X^{\frac{1}{2}}$	
1	+1	± 1
2	+1	± 1
3	-1	0
4	-1	0
5	$+\frac{1}{2}$	$\pm\frac{3}{4}$
6	$+\frac{1}{2}$	$\pm\frac{3}{4}$
7	$-\frac{1}{2}$	$\pm\frac{1}{4}$
8	$-\frac{1}{2}$	$\pm\frac{1}{4}$
9	$+\frac{1}{2}$	$\pm\frac{3}{4}$
10	$+\frac{1}{2}$	$\pm\frac{3}{4}$
11	$-\frac{1}{2}$	$\pm\frac{1}{4}$
12	$-\frac{1}{2}$	$\pm\frac{1}{4}$
13	0	$\pm\frac{1}{2}$
14	0	$\pm\frac{1}{2}$
15	0	$\pm\frac{1}{2}$
16	0	$\pm\frac{1}{2}$

Table 3



SUMMARY OF SIGNS OF SQUARES AND SQUARE ROOTS

Due to the fact that every sign is made up of two additional signs, a number can have any sign as long as its denominator is a power of two. To figure out the sign of the square of any number (positive, negative, neutral, or partially signed), the following steps must be taken. The denominator of the new sign equals half of the original denominator. The numerator of the new sign equals the new denominator subtracted from the original numerator numeral (not paying attention to the numerator's sign), but the sign of the difference is the sign of the sign of the square.

$$\left(+\frac{3}{4}\right)^2 = \frac{\left[3-\left(\frac{1}{2}\cdot 4\right)\right]}{\left(\frac{1}{2}\cdot 4\right)} = +\frac{1}{2} \qquad \left(-\frac{1}{4}\right)^2 = \frac{\left[1-\left(\frac{1}{2}\cdot 4\right)\right]}{\left(\frac{1}{2}\cdot 4\right)} = -\frac{1}{2}$$

To figure out the sign of a square root of any number (positive, negative, neutral, or partially signed), the following steps must be taken. Concerning a positively signed number. The denominator of the new sign equals the denominator of the original multiplied by two. The numerator of the new sign equals the sum of the original numerator and denominator. This square root is either positively or negatively signed.

$$\left(+\frac{3}{4}\right)^{\frac{1}{2}} = \pm\frac{(3+4)}{(4\cdot 2)} = \pm\frac{7}{8}$$

Concerning a negatively signed number. The denominator of the new sign equals the denominator of the original multiplied by two. The numerator of the new sign equals the difference between the original numerator and denominator. This square root is either positively or negatively signed.

$$\left(-\frac{1}{4}\right)^{\frac{1}{2}} = \pm\frac{(4-1)}{(4\cdot 2)} = \pm\frac{3}{8}$$

All of these rules should be very easy to understand especially when looking back at Table 3. These rules also work for the positive and negative full signs and the zero. Remember that for the positive and negative one signs; they have a denominator of one also. The zero sign follows both positive and negative sets of rules.

$$(+1)^2 = \left(+\frac{1}{1}\right)^2 = \frac{\left[1-\left(\frac{1}{2}\cdot 1\right)\right]}{\left(\frac{1}{2}\cdot 1\right)} = +\frac{\left(\frac{1}{2}\right)}{\left(\frac{1}{2}\right)} = +1$$

$$(-1)^2 = \left(-\frac{1}{1}\right)^2 = \frac{\left[1-\left(\frac{1}{2}\cdot 1\right)\right]}{\left(\frac{1}{2}\cdot 1\right)} = +\frac{\left(\frac{1}{2}\right)}{\left(\frac{1}{2}\right)} = +1$$

$$(0)^2 = \left(\frac{0}{1}\right)^2 = \frac{\left[0-\left(\frac{1}{2}\cdot 1\right)\right]}{\left(\frac{1}{2}\cdot 1\right)} = -\frac{\left(\frac{1}{2}\right)}{\left(\frac{1}{2}\right)} = -1$$

$$(+1)^{\frac{1}{2}} = \left(+\frac{1}{1}\right)^{\frac{1}{2}} = \pm\frac{(1+1)}{(1\cdot 2)} = \pm\frac{2}{2} = \pm 1$$

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$$(-1)^{\frac{1}{2}} = \left(-\frac{1}{1}\right)^{\frac{1}{2}} = \pm\frac{(1-1)}{(1\cdot 2)} = \pm\frac{0}{2} = \pm 0$$

$$(0)^{\frac{1}{2}} = \left(\frac{0}{1}\right)^{\frac{1}{2}} = \pm\frac{(1+0)}{(1\cdot 2)} = \pm\frac{1}{2}$$

$$(0)^{\frac{1}{2}} = \left(\frac{0}{1}\right)^{\frac{1}{2}} = \pm\frac{(1-0)}{(1\cdot 2)} = \pm\frac{1}{2}$$

GRAPHS

Since numbers can now have almost any sign from zero to one, they must also be able to be graphed. Earlier we learned that the Xi-axis is perpendicular to the X-axis. Well now we will learn that the $\pm 1/2$ signs are 45° from both axes.
The $+1/4$ axis is half way between the zero and the $+1/2$ axis. And the other signs lie in their respected places. The only difference in graphs like these is found when collectively looking at where the plains of the signs lie. The following figure is a graph of signs and where they lie in relation to the X-axis and the Xi-axis.

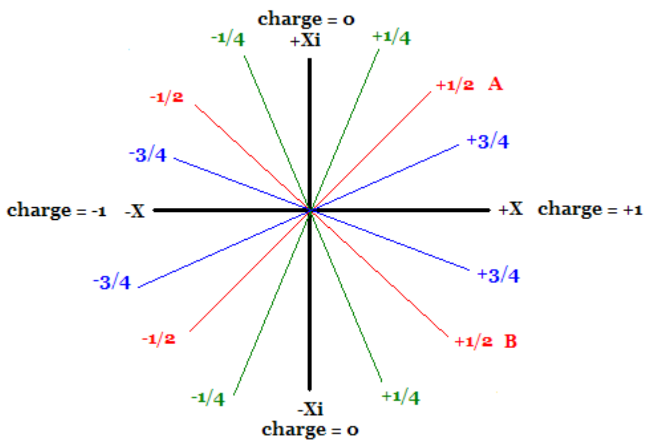

Fig 8.

Notice how there are two positive half sign axis on the right side of the graph. All of the signs above the X-axis are sectioned along with the positive neutral axis; therefore, all of these signs are partially positive or partially negative with a positive neutral sign represented in the rest of their overall signs. All of the signs below the X-axis are sectioned along with the negative neutral axis; therefore, all of these signs are partially positive or partially negative with a negative neutral sign represented in the rest of their overall signs. Some examples of the makeup of the $+1/2$ sign that is labeled A are the following.

$$\begin{pmatrix}\binom{+}{+}\\ \binom{+}{-}\end{pmatrix} = \binom{+}{i} \quad \text{or} \quad \begin{pmatrix}\binom{+}{-}\\ \binom{+}{+}\end{pmatrix} = \binom{i}{+}$$

Some examples of the makeup of the $+\frac{1}{2}$ sign that is labeled B are the following.

$$\begin{pmatrix}\binom{+}{+}\\ \binom{-}{+}\end{pmatrix} = \binom{+}{-i} \quad \text{or} \quad \begin{pmatrix}\binom{-}{+}\\ \binom{+}{+}\end{pmatrix} = \binom{-i}{+}$$

CONCLUSION

This concludes the Pelletier Postulate. Hopefully at this point, every specific detail and question has been explained and answered thoroughly. I believe that although neutral numbers might not be used on an everyday basis by all people, at least they are "discovered" now. I also believe that the discoveries made in this paper, will contribute to the fact that so many limitations that math had are now gone. No longer will math be confined to simple procedures, and no longer will the topics discussed in this paper be considered "imaginary," "impossible," or an "error."

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https://doi.org/10.14331/ijfps.2022.330151