
1 ISN'T EVEN
(I KNOW, RIGHT?)
NUMBER
12X SPIRAL

hey friend,
welcome to our first zine about numbers and math. We are going to take you on a journey through a whole bunch of different math concepts using only the number 1. Uh, well, one is not really a number, so we will show you some math without using numbers. Ok maybe a few other numbers, but really we are going to be working with 1. Why is it not a number? Well I'll explain, but lets just say the physical universe is full of rules, inputs and outputs, relationships, changes, and transformations. Beyond that, humans use, and make up other rules to make things easier. Sometimes people make up rules to get over on each other, but lets stick to making things easier with numbers for now, even though 1 is not a number.

If 1 is not a number, then what is it? Its a unit. Number lovers would rather not call it a number because then it would upset the Fundamental Rules of Aritmetic. Basically since the idea is that all numbers are prime or composites of primes, and the understanding of prime is a number divisible by itself and 1, AND since 1 is 1, then it can not be divisible by one and itself and is therefore not prime. We know, its weird.

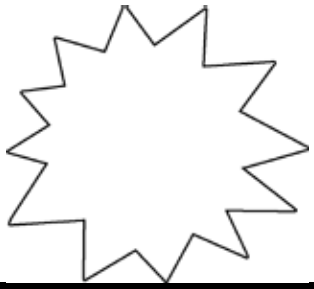
We can still consider it a number if you want. Its just kind of funny that we have made up rules that rule out 1 as a number.

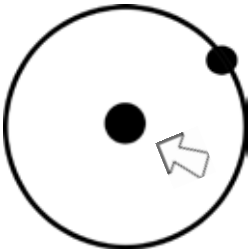
Anyways... here goes... a number of math concepts using only the number 1, which is not really a number.

Bring a pencil or markers along and mark it up.

First of all, who knows why we are here?
Actually dont answer that, we dont have all day.
Do you know how we are able to live here? By here we mean on the 3rd planet, orbiting the Sun. The nuclear furnace, the sun at the center of our solar system sustains life. That spitting fireball shooting through the galaxy that burns up the deserts in the summer and triggers all the plants to awaken, allows us to live. We are neatly embedded in a small film on a spinning rock and the solar cycle provided by the Sun and the Earth's atmosphere has ignited an ecosystem that allows us to eat, drink, and live.

But that Sun Tho! What is it? What is it made of? Well friends, on the chemical level, that pulsating chaos star, is Hydrogen and Helium. In case you didnt know, the entire cosmos is made up of the chemical elements, basically the periodic table... and get this, the 1st element is Hydrogen! What that means is that Hydrogen has 1 proton and 1 electron which makes it number 1 on the chemical level! Our existence relys on the number 1!! On the chemical level at least. The whole nuclear fusion bit... thats Hydrogen turning into Helium, or in the chemical-mathematical sense, the number 1 turning into the number 2.
Mind Blown, right?





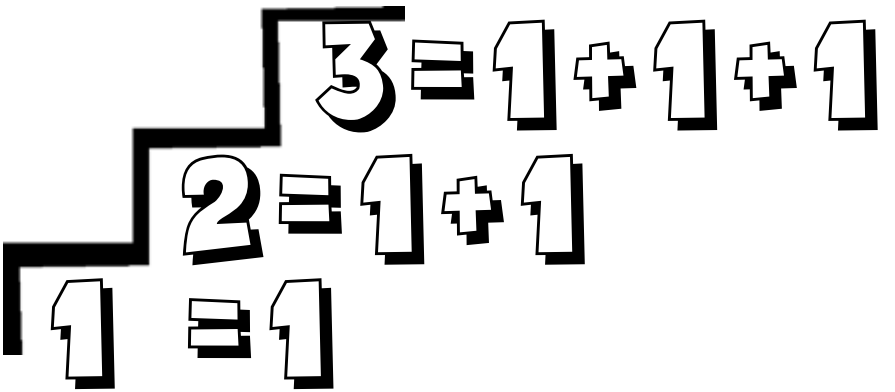
Hydrogen
1 Proton
1 Electron

http://earthguide.ucsd.edu/virtualmuseum/ita/07_2.shtml

Ok, that was probably enough science and chemistry for the day. Lets get back to math. So the number 1. Or the non-number 1. Lets just say 1. What can you do with it? Lets take 1 and add 1.
And then lets keep doing that. Oh man! we just discovered infinity! Can you imagine? If you start with 1 and then add 1, and then add 1 again, and continue that, uh... forever, then you would be counting to infinity.
Wanna give it a try! Go ahead. I will wait.

That my friends is what is called the natural numbers. They are also called the counting numbers cause it would probably be mean to teach your kids to count to backwards, 1st.

NATURAL NUMBERS AND INFINITY!



What if instead of adding 1 to 1...

What if we subtract 1 from 1...
Then hmm... we get ZERO!

ZERO!

1-1=0

Woah. Thats like nothing, nada, zip, zilch, but like a number still. Somehow this number was hard to understand. Some say **Fibonacci brought it back from North Africa.** What did he bring back? Nothing. haha, I mean zero. I hope he wasnt working for a king or queen. Jk. He brought the concept back from North Africa. At least thats 1 story.

Zero plus the natural numbers makes the whole numbers! Wait, I thought zero had no value... how could it change things if added then? **woah... meta.**

WHOLE NUMBERS

https://www.scientificamerican.com/article/history-of-zero/

Not that I want to, but what if we subtract 1 more from zero... then we get **negative 1! Kids!** Thats something else entirely. A **negative number!** And then what if we subtract another 1 and then another 1...? Then we get

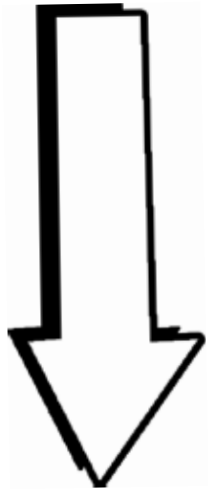
THE INTEGERS!

$$1-1=0$$

$$1-1-1=-1$$

$$1-1-1-1=-2$$

The lower it gets, the more it approaches negative infinity! **The integers are all the positive and negative numbers as well as zero.**

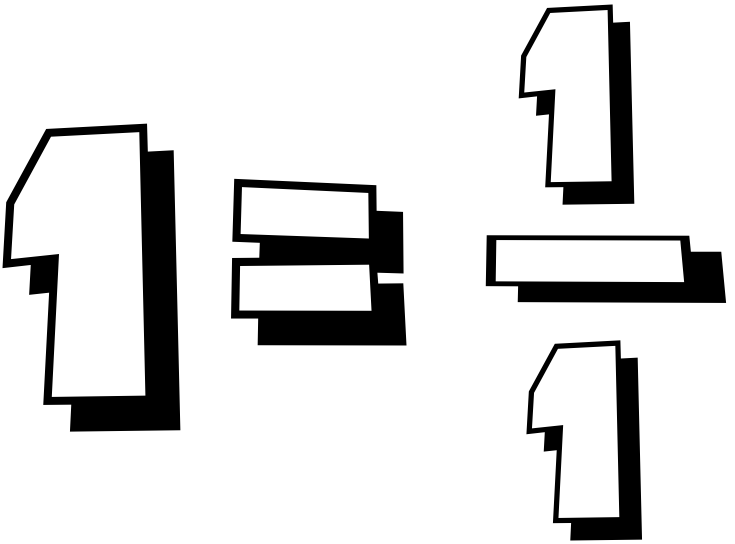


WE CALL THE NATURAL NUMBERS, WHOLE NUMBERS, AND THE INTEGERS, SETS OF NUMBERS, OR

NUMBER SETS

Theres only a few other number sets and I think we can get to them...

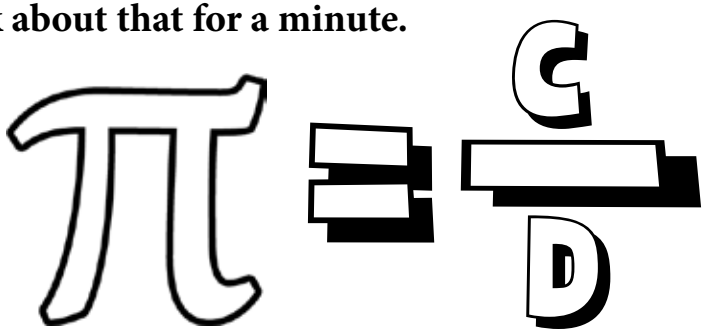
Check this out. So... every number is a fraction. Fractions are shorthand for whole or part, or part of a whole. All the numbers we have mentioned so far, besides zero, he's weird, have a 1 underneath!



Of course any number can be on top or bottom, but for all the integers, there is a 1 for the denominator, making the integer the numerator. Including **all numbers that can be represented as a fraction, or a ratio, introduces us to the**

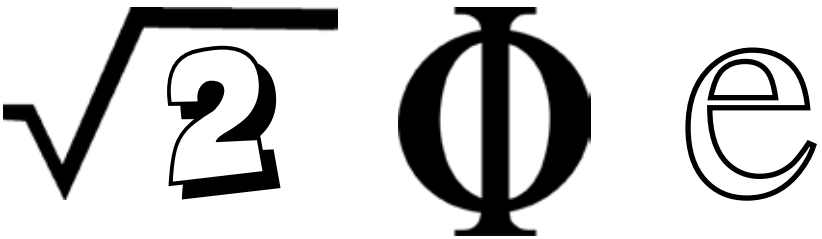
RATIONAL NUMBERS.

Now who decided that we should call numbers rational? **What, are some numbers irrational?** Actually yes... I'm sure you are familiar with pi, which is actually just a ratio of a circle's circumference to its diameter (btw the circle is the only 2d shape with 1 side). Other cool irrational numbers are phi, the number e, and basically any number that's decimal digits go on forevers. Or rather, **non repeating and non-terminating decimals. Think about that for a minute.**



We find irrational numbers when we take square roots of non perfect squares. If you try to take the square root of 1 + 1, or 2, then you end up with an irrational number. Irrational numbers were so despised by the Pythagoreans, that it is believed that the guy that discovered and shared the fact that the square root of 2 is irrational, Hippasus, was drowned at sea because he shared this secret of the Pythagoreans. Now thats gangster!

iRRATiONAL NUMBERS.



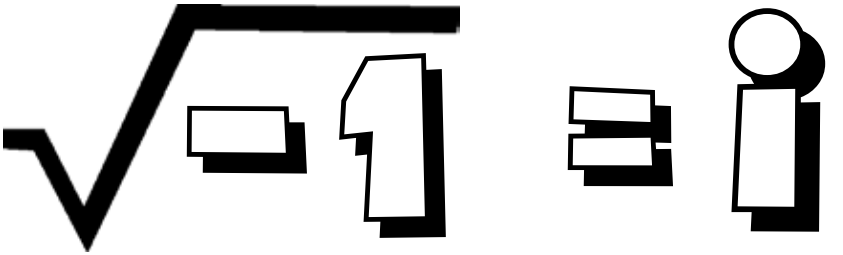
So now we have natural numbers, whole numbers, integers, rational numbers, and irrational numbers, and we have barely talked about any number besides 1, which isnt really a number. All of these number sets combine to make

THE REAL NUMBERS

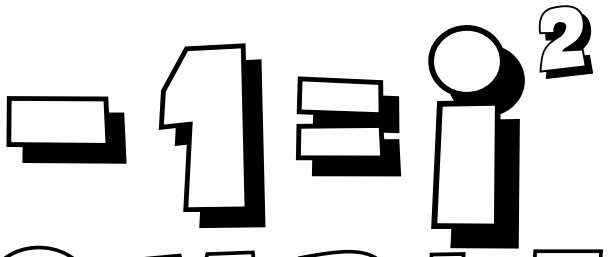
Now you are probably wondering, whats next? Unreal numbers? Fake numbers? Nope. Now my friends, we have imaginary numbers! Thats right, **Imaginary!**

iMAGiNARY NUMBERS

Its actually kinda odd (the description, not the opposite of even), but funny too, cause **guess how many imaginary numbers there are? 1!** Theres real **and** imaginary numbers. Together they form complex numbers. SO the one Imaginary number is 1! Well, kind of. Its the square root of negative one! Which, I mean, come on, its still negative one.



So follow me here... if you wanna use Mr. imaginary like some radar techs do, maybe you could square the square root and be left with negative 1. The number i is the street name for the square root of negative 1. If you have an i squared, then, well, you get negative 1. If you combine imaginary and real numbers, you get what is called complex numbers. And that my friends is the basics of number sets!



COMPLEX NUMBERS

Now lets try to find some other 1's.

Cause if you didnt know... they are hiding everywhere!
Remember how I showed you that the number 1 is hiding underneath all integers, besides zero (he doesnt count)... a little number one is also hidden on the top right of each number!
What!
So actually this introduces us to...

EXPONENTS

ALSO CALLED "POWERS"

1^1 ⇐ 1

Its like a little buddy, reminding you that there is only 1 of you, cause if it was 2 or 3 or any other number, you would have to put it there. Since it is assumed that you know it means 1 instance of that number, you do not have to write it, but you can!

$1^3 = 1 \times 1 \times 1$

which still just equals 1!

This brings us to another concept called

THE MULTIPLICATIVE IDENTITY PROPERTY

which is a technical way to say that the original number maintains its identity (its value) when multiplied by 1.

$$12 \times 1 = 12$$

$$XYZ * 1 = XYZ$$

...back to something about exponents

...it does not matter what the base, or big number is... it could be a bunch of variables, **if the exponent is zero, then the entire number reduces down to 1!**

ZERO AS AN EXPONENT

$$X^{\circ} = 1$$

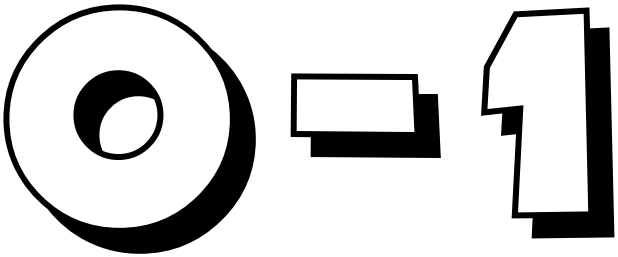
$$\left(\frac{\text{PPL}}{\text{NRG}}\right)^{\circ} = 1$$

Why? Basically because 1 is the coolest.
(Tho actually it has to do with the multiplicative identity)
Why do you think people want to

become 1 with the Universe?!

Remember how we mentioned infinity?

And then we considered ***negative*** **infinity**? This might sound weird, **but there is an infinity stuck between 1 and zero**! Hows that you ask? If we put 1 in the numerator of a fraction, and keep increasing the value of the denominator, we get closer and closer to zero, but never quite make it.



Can you believe theres an infinity in there? Crazy right? That must mean that there are different kinds of infinities. Now that is something to think about.

iNFiNiTiES!

(I win!)

$$\frac{1}{1}, \frac{1}{2}, \frac{1}{3}, \frac{1}{4}, \frac{1}{5}, \frac{1}{6}, \frac{1}{7}, \frac{1}{8},$$

the numbers will get **infinitesimally** small and still never reach zero!

Speaking of zero and one and infinities... did you know that **the entire language of computing** Is done with just those 2 numbers. Well zero, which is basically nothing, and one, which isnt even a number. Its called

BINARY

(kinda like bi-cycle, bi-weekly, bi-whatever)

0101101010101010001010101
0101101010101010101001010

Binary is a base-2 number system. We use a base 10 system (and so do most cultures, though there are some detractors that suggest base 12 is better, >>check out the dozenal society<<). Anyways, lets wrap our grey matter around this one... We say base 10 since there are only 9 digits on our system and when we "click" over to 10, we use 1 and zero as a place holder. In base-2 when we click over to 2, we get 10.

b ase 10		base 2	b ase 10		base 2
1	=	1	5	=	101
2	=	10	6	=	110
3	=	11	7	=	111
4	=	100	8	=	1000

Notice how 1 =1? Pretty cool, right? If you wanna learn more, look it up.

DIGIT SUMS

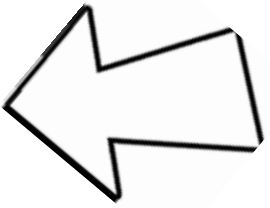
A digit is each individual number, including large numbers. So like the number 321, 3, 2, and 1 are all digits. The word comes from the latin word digitus, which means finger, toes. Sum just means to combine or add values. So when we add 3 + 2 + 1we get 6. So the Digit Sum of 321 is 6. It is also called the digital root. 1 ninth of all numbers have the digital root of 1!

DIGITAL ROOTS

have an amazing and forgotten way to check mathematical operations... If you add, subtract, or multiply numbers (even crazy big ones) **you can check your calculations by taking the digital roots of the numbers and the answer**. If the root operation holds true, then the main operation should be true too.

check it:

$$\begin{array}{r} 123 \\ +\ 210 \\ \hline 333 \end{array} \qquad \begin{array}{r} 1+2+3 = 6 \\ 2+1+0 = 3 \\ \hline 3+3+3 = 9 \end{array}$$



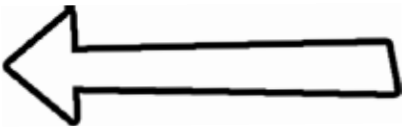
http://www.instructables.com/id/Mental-Math-Digital-Root-Extraction

Ok, so I know I said we were sticking with One, but if we can play with Zero too, we can explore a few more ideas, like 10. Ok, so thats another number but its made up of 1 and 0 and 0 is basically a place holder which is why Zero is such a bizarre concept. It is said that Fibonacci brought it back from North Africa. Brought what back? Zero. I doubt anybody was happy that he brought nothing back from his trip. Anyways, zero is largely a placeholder. 10 means 1 ten of something. 100 means 1 hundred of something. **Speaking of 1 hundred of something, we stumble into percents, which literally means per hundred.**

PERCENT

Percents are actually fractions. 1 percent. is 1 over 1 hundred.

$$\frac{1}{100}$$



or you can leave it in the 1's place and just put the percentage symbol next to it like this

1%

If you want to write a percent and not use a fraction then **you can use a decimal**. You basically just move the decimal (thats kinda hidden) 1 + 1, or 2 digits to the left. So 1 percent looks like. This is useful for multiplying percents

.01

Now that we are moving decimals around we may as well mention

SCIENTIFIC NOTATION

Scientic notation **is a way we can look at giant numbers without putting a bunch of zeros as placeholders.** It combines multiplication, decimals, and exponents. lets say you wanna write 12 trillion. Instead of writing

12,000,000,000,000

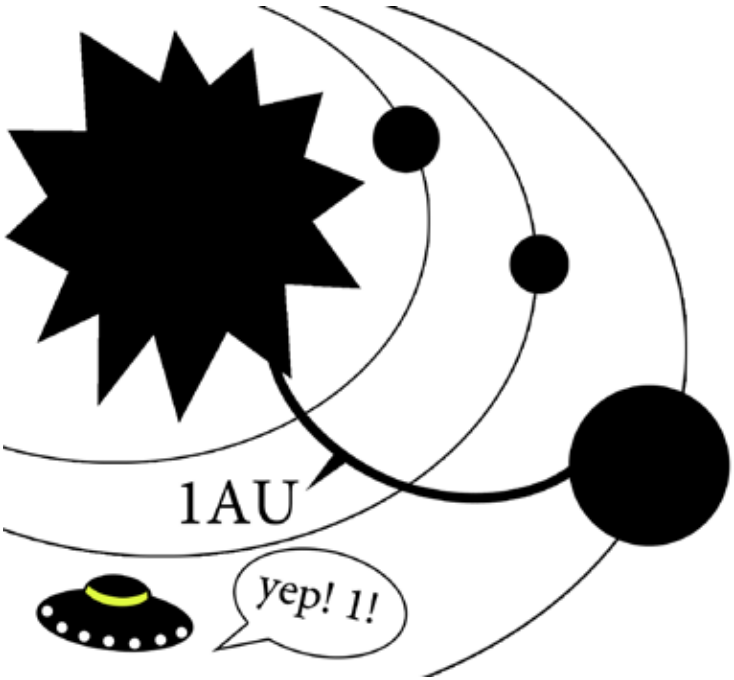
you could write

$$1.2 \times 10^{10}$$

the exponent on the 10 is the number of decimal places moved.

Since we are talking about large numbers... **lets talk about astronomical numbers!** Do you know how many **AU (astronomical units)** the Earth is from the Sun? 1! Haha, thats right. 1 AU which is equal to 93 million miles.

ASTRO-NOMICAL UNITS



When you get into **Algebra** you will use variables, such as x or y or any letter pretty much. Just like the hidden exponant of 1, the hidden denominator of 1, **there is another hidden 1 when we look at variables.**

$$X + X = 2X$$

X can be anything. Apples, Cars, Houses, Problems... but the important thing to notice here is that there is another hidden 1 in front of each X! You could write them, but you dont need to.

$$1X + 1X = 2X$$

we call those numbers in front of the variable, coefficients, so when the coefficient is 1, it is unnessary to write it. Kinda like when you ask a friend for a ride somewhere, they probably assume that you want 1 ride, and not 5.

COEFFICIENTS

So I wanted to explain why 1 is not a number, cause come on, it's totally a number. **More like the best number *ever.*** When we start thinking about all numbers and whether or not 1 and the number are their only factors (prime) or not, meaning that other numbers divide into them and reveal whole numbers, then we end up in an odd place trying to figure out if 1 is prime or what.

The fundamental theorem of arithmetic, **or** the unique factorization theorem **or** unique-prime-factorization theorem, states that "every integer greater than 1 either is prime itself or is the product of prime numbers, and that this product is unique, up to the order of the factors." Since 1's factors are 1 and at the same time, "itself" then the rule makers decided that maybe we should not call 1 a number at all, and just call it a unit. Crazy Right? And thats why

1 IS NOT A NUMBER

Hey, thanks for checking out our project. BTW, I am Pemdas the Panda. We are always working on more projects. Feel free to send us questions, concerns, or ideas. We love collaborating with people. Check out our other projects at 12xspiral.com and send us an email at 12xspiral@gmail.com

12XSPIRAL

There are lots of mathematical concepts that we can learn to understand just by considering the number 1, all the places it is hidden, and how it relates to the other numbers. In this zine we look at the number sets; natural numbers, whole numbers, integers, rational numbers, irrational numbers, real numbers, imaginary numbers, and complex numbers. We also look at exponents, multiplication properties, zero as an exponent, different kinds of infinities, binary code, number bases, digital roots, percents, scientific notation, astronomical units, as well as variables and coefficients. We do this all with only the number 1, and within 24 pages! Ok, maybe we use a few more things, but still mostly just the number, I mean unit, 1.

There are other things that can be considered as well such as squares and cubes and triangle numbers, the unit circle and more. This is just a rough draft. We will add to and develop it as time goes on. Feel free to send critiques, ideas, requests, and we also accept money (you know, to keep developing the street math revolution) to 12xspiral@gmail.com

For every zine or download we acquire donations for, we will give more away. We are on a mission to make mathematics more fun and accessible. Check out our site 12xspiral.com Consider what we have to offer and contribute if you can. If you share it, thats even better. Money is all make-believe anyway, ideas are the real currency.