The 4th Dimension Explained by ICOSPT

In the beginning...

there was fucking nothing. all black. somehow. white American cops appear and shoot up the black empty space until one of them dropped Castle Bravo on their heads and BOOM! An average explanation of the atheist's stupid theory of how the whole universe was created. The fucking Big Bang. Better off be banging yall's mothers than believe that big bang bullshit. Doesnt it sound more better and interesting about having many MILFs riding you live there's no tomorrow, rather than some said "picture of the universe when it was first created"? I get the whole idea of light taking its time to show us this but, I'd pick sex tbh.
Fucking atheists be looking at dumb shit like some monkey and saying that's John F. Kennedy. Or a gorilla and say that's Muhammad Ali. Hell. Might call a spider monkey Tom Holland. Or they might look at a picture of a weird ass fish from, idk. 2 years ago? or was it 65 million? 100 million? 19th century type shit. Go grandpa! Now, after a couple of years. They started realizing that there are axes in this world. And that there are many other spatial dimensions. Like the 0th. The 1st. The 2nd. The 3rd. Now, we have started learning about the 4th dimension and more. But one of the questions that some people ask about the 4th dimension is:
"What the actual FUCK is the 4th dimension?"
Greetings my sweet little children. Im ICOSPT. I prefer to not say my real name. Why? I like anonymity. I dont want my ass molested by some dude that somehow found my private information by some simple OSINT and google hacking. I mean. I have stolen many people's CNPs (Romanian version of the Social Security Number (SSN) or Social Identity Number (SIN)). But i dont use them for illegal purposes.... yet... Fucking bullshit how some companies leave out receipts out on the internet for the public to see. Fucking hell.
Back to what i was saying. I will now waste your time with this stupid little PDF file. its too complicated to be a fucking picture book. So. Fuck y'all who prefer picture books. And this is also too smart to be literature. or a fucking novel. Fuck you people who enjoy literature. I absolutely hate literature. Not useful in ANY FUCKING WAY. What's my first interview question for a job as a cashier at Save-on-Foods gonna be? `Recite the integrity of William Shakespere's "Julius Caesar"` ? Hell fucking no. And yet i still need to live, knowing there's literature around me. And old hags that still read it, which is why the school system is still making kids learn old ass books, for no fucking reason. "B-but we need t-t-to learn about history and know the languages of t-the past!" Yes. You're right. But not

fucking literature. Boring as fuck. Ok. There are some good books out there from the "old days". But those are real gems to read. Mein Kampf. Roadside Picnic. The Bible. And many more.
Dont worry about my intelligence. im just a retard like yall. but somehow. i might say. im a self-diagnosed schizophrenic. in other words, i dont even know what the fuck i wrote. i guess i forgot my vitamin D. Zinc too, i think. I got too ahead of this and it kind of became a hobby to make this. I've done many studies on this, just through my own head. Also decided to do some shit people never thought of. And i must say. Im impressed with what i have achieved so far. At least im not so useless after all.
Before jumping directly into the 4th dimension, you need to understand the dimensions we are familiar with. see how they all work. and. the differences between them. just. bear with me. If you jump directly into the 4th dimension, you wont understand shit. go watch those fucking grade 1/2 kid-friendly videos, if you got an IQ as a toddler. OR go watch em fucking Indian youtubers. i cant stand their accent and language. yet, i can still follow along, even if they speak Punjabi. But still. They are as much of a fucktard as their own credit card scamming methods. Like. get an American accent and dont use stupid techniques like there's a problem with my computer and you need my credit card information.
Enough yapping now. well. im still gonna yap more about this. but. enough with the introduction. Ever wondered how a so called "schizo" lives and thinks? I, with honor, will show you with this funny PDF.

The Dimensions We Know

0 Dimensions (0D)

What is 0D? well. picture a single dot. like this period "."
Imagine living in that dot. Can you move? no. In my words, a dimension is just a pair of 2 directions. since in the 0th Dimension, there is no axis, hence the name: "The **0**th Dimension", there are no directions. i don't think a 0D world even exists. Maybe to an atheist, it would. What happens after death? Atheist: "The 0th dimension!"

1 Dimension (1D)

What is 1D? now we got 1 dimension. a perfect way to visualize the 1st Dimension is a line.
Can you move? yeah. where? **Forward & Back**. The 1st Dimension is made in just 1 axis. The " `x` " axis. Along the `x` axis, we can move in those **2** directions.

2 Dimensions (2D)

What is 2D? like i said in the 0th Dimension, a dimension is kind of a pair of 2 directions. In the 1st dimension, we got 2 directions. But now in the 2nd Dimension, we have, you guessed it, **4** directions (**Forward; Back; Left; Right**) and **2** axes (the `x` axis and `y` axis). Basic geometry, we in school, and gotta draw a graph. We draw the `x` axis and `y` axis. Easy peasy lemon squeezy. Good examples of shapes that are in 2D are:

- squares
- circles
- triangles
- the gons
- parallelograms
- anime girls
- quadrilaterals

Something worth noting is that, the `x` axis and `y` axis are both perpendicular with each other. In other words, the degree between the axes is 90 degrees.

3 Dimensions (3D)

Our world. We live in 3D. Cubes, pyramids, spheres, so many beautiful shit. We are lucky to live in the 3rd Dimension. Can you define the 3rd Dimension? No? Dumb fuck lmfao. As we know:

- **1** Dimension = **1** axis = **1** pair of directions (**Forward; Back**)
- **2** Dimensions = **2** axes = **2** pairs of directions (**Forward; Back; Left; Right**)

What about the 3rd dimension? Look up. Get it now? No? Keep looking up. Maybe you'll soon realize why you lack parental figures. Then you'll look down at the floor in sadness after your realization. Perfect explanation of the 3rd Dimension. There are now 3 axes (The `x` axis; the `y` axis; and our beloved `z` axis) and 3 pairs of directions (**Forward; Back; Left; Right; Up; Down**). Examples of some 3D shapes are:

- Cubes
- Pyramids
- Spheres
- Cones
- Prisms

- And your mummy's funny phallic toy under her bed that goes *bzzzzzzzz bzzzzzzzzz bzzzzzzzzzzzzzzzzzz*

Now this `z` axis, as you see on a cube, is perpendicular with the `x` axis and the `y` axis. and shit like that.

Visualizing Each Dimension

0D

MOTHER FUCKER! YOU CAN'T MOVE

1D

1 Dimensional beings live on a line, because that's the only 1 Dimensional shape there is. It can move forward and back. They cant look left or right. Nor up nor down. just front and back. Imagine playing terraria, but instead of 2D, the plane turns into a line.

2D

2 Dimensional beings live on plains. Whether its on a circle, a square, doesn't matter. It just has to be 2 Dimensional. The being can move forward, back, left, and right.
Now imagine a square. and on that square, a line that goes across the length of the square. That line is our 1 Dimensional world. Now. The 2D being can see the 1D world. Everything. And the little 1D being in it too. But the 1D being is oblivious that the 2D being is watching it.
Now imagine that there is a blue dot near the 1D being, and after it, a red dot behind that blue dot. Can the 1D being see the blue dot? yeah. Can it see the red dot tho? No. But can the 2D being see that 1D blue dot? Yeah, but it an also see that red dot AND the 1D being **at the same time**. As well as determine the thickness of those dots.
It will watch that 1D being struggle as the 2D being laughs its ass off.
But eventually, it gets tired of laughing and helps the 1D being out by taking that red dot, removing it from that specific 1D world, and place it next to the 1D being back in that 1D world.

3D

No need to explain this too hard. We can move forward, back, left, right, up, and down and everything is 3 Dimensional.
Now imagine a square. We have a little 2D being there. and next to it, a blue

square, with a red circle inside it. Can the 2D being see the circle in the square? No. No matter where the 2D being goes, it cant see the circle. Give him some help. We 3D beings can see that 2D being struggling, the blue square and its thickness, and the red circle inside it **at the same time**.
We can help the 2D being out by reaching and grabbing that red circle inside that blue square, and place it back into that 2D world outside the square. Now the 2D being can see the red circle.

THE 4TH DIMENSION

The 4th dimension is something we, as 3D beings, don't fully know about. But we can at least get an idea of how 4D beings live and view our 3D world.
As we know, our 3 dimensional world consists of 3 dimensions (`x` axis; `y` axis; `z` axis) and 3 pairs of directions (**Front; Back; Left; Right; Up; Down**). But how would we describe the 4th dimension? Also, the 4th pair of directions.
There are many theories about the 4th dimension. Some people view the 4th dimension to be non-spatial. In other words, they see the 4th dimension as the dimension of time. Time is a pretty cool theory, and the strongest.
A good example to better understand the dimension of time is a flipbook. Why a flipbook? Take each page. Each represents a 2D "world". Stack each page, and you get a flipbook, which is a 3D object. Now, to 2D beings, that `z` axis is the dimension of time to them. But to us 3D beings, its just a pair of directions. Not time.
Either way, time behaves differently. So, let's see what my boy Albert Einstein says about the 4th dimension. He says that time, is incomplete. True. We have a future. Going into the future, we got more future ahead of us. To calculate an 'event', we have the 4 dimensions. `x` `y` `z` which are the spatial dimensions we know, and for this theory: `t` aka Time.

Alright. Now to study the 4th dimension, let's add another axis. The `w` axis.
"B-but the `w` axis i-isn't p-p-perpendicular with the other 3 axes!"
Shut the fuck up. Just imagine a 2D being trying to see the 3rd dimension. Its impossible for it to pinpoint exactly where that `z` axis. Mother fucker don't even know what up and down is. And even if it tried, that `z` axis wouldn't look perpendicular to the other 2 axes. Try it on paper. Try drawing the `z` axis on paper. Does it look perpendicular with the `x` and `y` axis? Nope. Now take a cube. Find the `w` axis. Impossible of course.
Ever heard of a hypercube? A hypercube is a cube with `n` dimensions. A pretty cool magic shape. just input the dimension, and you'll get the shape cube from that dimension. Only problem with that. it would just look like a 3D representation

of that shape, on a fucking 2D screen/sheet. Kind of bullshit. because even trying to view 3 dimensional objects on a sheet of paper is kind of confusing but still possible. So another way we can try to view them, is through mathematical equations. Like a fucking Mathematician.
A line doesn't need any equation to determine its length. Fuck em math teachers. We all know that a square. We have 2 funny things we can find. Its **Perimeter** and **Area**. To calculate its Area, we use the `A=l*l` or `A=l²` formulas. Where `A` is the Area and `l` is the length of one of the square's sides. And the Perimeter, the `P=4l` formula.
Onto 3D, a cube. We also have 2 things to find. The inside, aka, the **Volume**, and the outside, aka, the **Surface Area**. To calculate the volume, we use the `V=l*l*l` or `V=l³` formulas. And for the Surface Area, we use the `SA=6l²` because of the 6 squares that make up the cube. Pretty cool right?
Now to 4D. What are the properties that we have to calculate? And **HOW** would we calculate them. First of all. What is a 4D cube? A tesseract. What the fuck is that? Good question. The tesseract is a 4 dimensional cube, but of course, its just a 3 dimensional representation of it. **AND YOU'RE VIEWING IT ON A FUCKING 2 DIMENSIONAL SCREEN**. Kind of bullshit. But of course, we got formulas and imagination. We know a square has **4** lines, a cube has **6** squares, and then, a tesseract, has **8 cubes**. How? look closely. Looking at the tesseract, you can see that there's an outer cube, and an inner cube. Where's the other 6? Think of the 3D cube, now look at the tesseract and where you know, there should be a square face on the cube, is the same place where there should be a cube for the tesseract. One in the front. One in the back. Right. Left. Top. and Bottom. Now shut up, because i know that y'all are going to cry and say that those 6 cubes don't even look like cubes, but much rather 3D trapezoids. Because, for fuck's sake. Its a 4 dimensional shape. We can't see that fucking `w` axis. So of course, it doesn't look all perpendicular and normal. But to 4 dimensional beings, its all perfect and perpendicular. Now. What properties does the tesseract have. Well. There's the **Hypervolume** and the **Surface Volume**. To calculate the hypervolume. we need to use the formula `H=l⁴`. And to calculate the surface volume, we need to use the formula `SV=8l³`. Right. We got the formulas. Now you can do *basic* 4D math. We know when working with coordinates in a 2 dimensional space, we use `A(x,y)` and on 3 dimensional space, we use `A(x,y,z)`. Now for that 4 dimensional space, we then use the coordinates `A(x,y,z,w)`

Now. enough with equations. now we think and visualize geometrically. Y'all familiar with shadows? Shadows, in our world, are 2D projections of 3D objects when a light shines on them. In a 2D world. a shadow would look 1 dimensional. Put a square in front of light, you get a shadow that looks like a line. In our 3D

world, take a cube, and shine a light at it. The shadow looks like a 2 dimensional square. Easy to understand. Which means if light shines at a 4 dimensional object, it casts a 3 dimensional shadow. Shine a tesseract, in the 4D world, you get a shadow that looks like a cube. pretty cool, right? But if you look at a tesseract you usually see, it always moves. You see that the inner cube becomes the outer cube, and the outer cube - the inner cube. How does that work? Short answer: The tesseract is rotating. How? Let's make a cube with those toy magnets. You know. The ones where we all had problems choking on those fucking magnetic balls when we were little and retarded. All the corners are balls, and the edges - lines. Shine a light at it. Now look at its shadow. it looks like a 2D square, inside another 2D square. Now carefully rotate the cube and see how the inner square becomes the outer square, and the outer square - the inner square. Shapes in higher dimensions will always appear super weird and confusing to the beings in the lower dimensions. Lets imagine this. A 2 dimensional object moving through a 1 dimensional world. if a circle we're to pass through a 1 dimensional world, it would appear as a dot that is growing to be a line, then back to a dot, and then disappear. That 1 dimensional being would probably shit himself after witnessing that lmfao. Now. a 3 dimensional object passing through a 2 dimensional world. If a sphere were to pass through that 2 dimensional world, it would appear as a small circle, then it will grow to be a big circle, then back to a small circle, then poof. Disappears. Now that 2 dimensional being will might want to see a therapist. Now. if a 4 dimensional object, like a hypersphere, were to pass through our 3 dimensional world, it would appear as a small sphere, then grow to a bigger sphere, then back to a small sphere, then disappear. Because the hypersphere is traveling along the `w` axis.

And also, how would 4 dimensional beings see us 3 dimensional beings? Picture a box. A solid black box. And a red ball inside. Just to let you know, the black box is solid. Can we see the red ball inside the black box? No. It doesnt matter where we look. We cant see the red ball. Now. What a 4 dimensional being would see, is the solid black box, the red sphere inside the solid black box, and us 3 dimensional beings, struggling to see that red ball. Just like how we look at 2 dimensional beings. What a 4 dimensional being can do to help us, is move its hand along the `w` axis, and grab that ball from inside the black box, without even cracking it open. we wont even know its been taken. Why? because, lets say we are still talking about us with the 2 dimensional beings. If we try to take that red circle, we need to move our hand along the z axis to get ahold of that circle, if we grab that circle, but stay in that 2 dimensional world, and then move along one of the 2 dimensions (x or y) we would bump into the square thats around the circle, the 2 dimensional being would think that the square is fucking possessed because it cant see up or down. That doesnt exist. So it would also wouldnt know if the

circle has been taken or not. Or if it even exists inside that square. Same thing in our case with 4 dimensional beings tinkering with 3 dimensional objects. Now let me tell you what happens, when a `n` dimensional being lets an `(n+1)` dimensional being, tinker with `n` dimensional shapes.

The Mobius strip is such a work of art. What is the Mobius strip and why is is such a work of art? Well. First of all. Let me fucking strangle you. I'll choke you to fucking death because there is absolutely no fucking way you've never heard or seen the Mobius strip. Take a long rectangular piece of paper. Make sure its around 2-3cm in width and at least 20cm in length. Now take one of the ends and flip that end upside down. Then, while holding that position. join the ends together without undoing that twist. Tape it together, then boom. You got yourself a **Mobius strip**. Now what's special about the Mobius strip is that, unlike a normal cylindrical object, where there are 2 side: one on the inside and one on the inside outside, the Mobius strip has just 1 side. Put your finger or use a pencil to move across the sheet. after one full 360 run, you either find yourself inside the strip if you started from the outside, or outside the strip if you started from the inside. Do one more 360 run, and you're back where you first started. Pretty amazing, right? A simple sheet of paper when turned over and around can make a true work of art.

What if a 2 dimensional being was viewing this mobius strip. Well it would just look like a rectangle is intersecting itself. Why? I'll explain soon. Now we have a good understanding of what a Mobius strip is and how it works. You know what that means!

Let's step up a dimension. Now instead of a piece of paper. We have a normal cylindrical tube. Let's take one end and join it with the other end and **OH MY FUCKING.. DID I JUST MAKE A DONUT!!! ROUND OF APPLAUSE FOR ICOSPT!!!** Ok so. We cant make it. Even if we twist one of the ends and do it, we

still get a fucking donut. We cant do it. we need some help. We'll call our 4 dimensional friend, **Jacques von Robertson-kun**. We'll give him that cylindrical object and let him twist an end and join the ends together inside the 4th dimension. Once we get that object back, we now have something that's called **The Klein Bottle**. We thank you very much for your help Jacques von Robertson-kun ♡! You may go back to your usual eating Jews inside out hobby. Have fun~. Back to the bottle. What's special about the Klein Bottle, is that it's an upgraded Mobius strip. Do the same thing you did with the mobius strip. Just. Dont shove your dick in there. Who know what would happen. Nuclear fusion? or maybe you'll just break the bottle and split your dick in chunks. Imagine a little guy walking along the surface. He goes inside, goes around. Then back up through the tube and outside through the bottom. Wow! So cool! Every mathematician's favorite shape. Not mine tho. Im not a mathematician. i am an autistic fuck. Now. To the thing about how a 2 dimensional being views a Mobius strip being some random rectangle intersecting itself. The same way we see the Klein bottle. The tube goes up, through the bottle itself, the kind of expands, becoming the bottle, then back to the tube. In a 4 dimensional space, the Klein bottle would look like just a bottle with no intersections and with the cool twisting feature, like how we view the Mobius strip to be a piece of paper with no intersections and with the cool twisting feature.

The 4th Dimension in the Programming World

As a programmer myself, i have worked many times with vectors and matrixes. But for some people, they like to take big steps and do some stuff that start to become confusing to make. For these examples, i will be using the **Rust** and **C++** programming languages to demonstrate how we make shit on the computer.
We have our own names for each dimension. All consisting of numbers, strings (words), characters, and Boolean shit. But ill be using numbers here, to not make things confusing.
For the 0th dimension, we use normal single value variables.

Rust:

```rust
fn main() {
    let x = 4;
}
```

C++:

```
int main() {
    int x = 4;
}
```

For the 1st dimension, we use vectors/arrays. Each number in the vector has some numbers and each place have an ID. Starting from 0 to n-1. Think of the numbers in the square brackets like coordinates in mathematics. (ex. A(x); A(x,y); A(x,y,z))

Rust:

```
fn main() {
    let v: vec<i32> = vec![0, 2, 4, 6, 8];
}
```

C++:

```
#include <vector>
int main() {
    vector<int> v = {0, 2, 4, 6, 8};
}
```

For the 2nd dimension, we use something that is also used a lot in mathematics. Matrixes/2D arrays. Here. I define a 2x2 matrix

Rust:

```
fn main() {
    let m: [[i32; 2]; 2] = [
        [1, 2],
        [3, 4],
    ];
}
```

C++:

```
int main() {
    int m[2][2] = {
        {1, 2},
        {3, 4}
```

```
    };
}
```

For the 3rd dimension, we use a 3D matrix/3D arrays. For this example, im defining a 3x3x3 3 dimensional matrix

Rust:

```rust
fn main() {
    let m3d: [[[i32; 3]; 3]; 3] = [
        [[ 1,  2,  3], [ 4,  5,  6], [ 7,  8,  9]],
        [[10, 11, 12], [13, 14, 15], [16, 17, 18]],
        [[19, 20, 21], [22, 23, 24], [25, 26, 27]],
    ];
}
```

C++:

```cpp
int main() {
    int m3d[3][3][3] = {
        {{ 1,  2,  3}, { 4,  5,  6}, { 7,  8,  9}},
        {{10, 11, 12}, {13, 14, 15}, {16, 17, 18}},
        {{19, 20, 21}, {22, 23, 24}, {25, 26, 27}}
    };
}
```

If its too hard to understand. Think of it as a Rubik's cube. Each number has its own cube in the Rubik's cube.
Now if we want to make a 4 dimensional matrix/4 dimensional array, we just follow the pattern. Since ill still be using the size of 3 (3x3x3x3), it means we will have 81 numbers

Rust:

```rust
fn main() {
    let m4d: [[[[i32; 4]; 4]; 4]; 4] = [
        [
        [[ 1,  2,  3], [ 4,  5,  6], [ 7,  8,  9]],
        [[10, 11, 12], [13, 14, 15], [16, 17, 18]],
        [[19, 20, 21], [22, 23, 24], [25, 26, 27]]
        ],
        [
```

```
        [[28, 29, 30], [31, 32, 33], [34, 35, 36]],
        [[37, 38, 39], [40, 41, 42], [43, 44, 45]],
        [[46, 47, 48], [49, 50, 51], [52, 53, 54]]
        ],
        [
        [[55, 56, 57], [58, 59, 60], [61, 62, 63]],
        [[64, 65, 66], [67, 68, 69], [70, 71, 72]],
        [[73, 74, 75], [76, 77, 78], [79, 80, 81]]
        ]
        ];
}
```

C++:

```
int main() {
    int m4d[4][4][4][4] = {
        {
        {{ 1,  2,  3}, { 4,  5,  6}, { 7,  8,  9}},
        {{10, 11, 12}, {13, 14, 15}, {16, 17, 18}},
        {{19, 20, 21}, {22, 23, 24}, {25, 26, 27}}
        },
        {
        {{28, 29, 30}, {31, 32, 33}, {34, 35, 36}},
        {{37, 38, 39}, {40, 41, 42}, {43, 44, 45}},
        {{46, 47, 48}, {49, 50, 51}, {52, 53, 54}}
        },
        {
        {{55, 56, 57}, {58, 59, 60}, {61, 62, 63}},
        {{64, 65, 66}, {67, 68, 69}, {70, 71, 72}},
        {{73, 74, 75}, {76, 77, 78}, {79, 80, 81}}
        }
        };
}
```

The 2D array represents the **Area** of a square (a 2 dimensional shape).
The 3D array represents the **Volume** of a cube (a 3 dimensional shape).
Then the 4D array represents the **Hypervolume** of a Tesseract (a 4 dimensional shape).
Code can really be a huge help to mathematicians, when doing algebraic and geometric calculations. Unless you want to fucking sit on your desk with a pencil and paper, throwing god damn crumpled balls of paper all over the fucking room like in cartoons.
Haha you thought i got fucking calmer, didn't you. HELL FUCKING NO. Im still

fucking mad, like British word for goddam mentally insane, and mad, like im fucking furious. Yes. I got shit with all of you. I know yall gonna say dumb fucking bullshit like "Programmers cant do shit, they rely on the computer for calculations and a brain." Says you motherfucking retards that use a Texas Instruments scientific calculator during algebra class. Or instead of doing the actual lessons the computer science teacher teaches you, you stay on Friv, or CoolMathGames the whole class hour. Yall should be fucking ashamed of yourselves. Your teachers are trying their best by teaching you all the fucking shit you need to add to your fucking mental dictionary, for you to pass school. And yall throwing that useful information away?? Have some fucking respect for your teachers. Except any teacher that teaches any language. Just. Fuck them. Also. Shoutout to all Social Studies teachers, History teachers, and Geography teachers. They're chill asf. Greatest teachers of all time. A moment for them o7.

My Studies on the 4th Dimension

I can basically say that everything i've written above is all that i've discovered, by myself, about the 4th dimension but i also want to keep my schizophrenia up and decided to continue my studies by studying different 4 dimensional shapes and shit. I chose to put my all of my time into a 4D trapezoid. Why the fuck a 4D trapezoid? The short answer is, im retarded. Long answer, the tesseract, that fucking 4D rectangle, and the hypersphere all have been getting some attention. And i want to start off with something some people haven't heard about. Cuz they're all dumbasses. The more unusual the space is, the more better. Here is what i managed to milk.

There are many different types of trapezoid, but i chose to work on a type of a trapezoid where all the sides are different sizes but the top and the base are parallel. Its got 4 sides, and 4 corners. Like any other fucking quadrilateral. Add another dimension. we got a trapezoidal prism. nothing too special about it. its fairly quite simple if you think about it. Not like many other dumbasses that drop it because they thought it looks too hard. That's right. Go suck you mommy's fat tiddies and cry like a bitch. A trapezoidal prism is made out of 2 identical trapezoids, and 4 different rectangles. See? Not that bad. Its because i have a fucking brain, unlike yall.

Let's make funny for yall. Trigger Warning! High levels of schizophrenia and eggnog.

A 4 dimensional trapezoid is made out of 2 identical trapezoidal prisms, 2 other identical trapezoidal prisms, and 4 different rectangular prisms. Sounds crazy, but im not kidding. since the trapezoid is a quadrilateral, just like the square, we can refer to the 4d version of the cube, the tesseract. see how we see those 8 cubes

that make the tesseract, we can go back and look carefully at the 4 dimensional trapezoid. and we see those 4 trapezoidal prisms (the 2 identical and the other 2 identical), and the other 4 different rectangular prisms. How cool is that? Not impressed?

Fuck you.

Now. We can now do cool stuff with the 4 dimensional trapezoid. Like what? We can find its Surface Volume and its Hypervolume. but. we dont have the formulas. Oh no! Well. that's alright. You got me. Who stayed and studied the shape and found the exact formulas we need to determine those 2 properties. Yall like relying on other people, dont you, you lazy fucks?

Lets start off with the Surface Volume. Harder to determine than the Hypervolume (which just needs one thing added to the 3 dimensional version of the formula but i decided to do this last because it will be more better to write it down after im finished with the Surface Volume).

As we know, the 4 dimensional trapezoid, as i said above, for yall blind ass retards, is made out of 2 identical trapezoidal prisms, 2 other identical trapezoidal prisms, and 4 different rectangular prisms. Put in the same rule, like in the tesseract, add the volumes of all of the cubes. Here with the 4 dimensional trapezoid, find the volumes for each of the rectangular prisms. Then all we need to do is take just 2 trapezoidal prisms. One of each different trapezoidal prism. We find the volume for each of those 2, then multiply both answers by 2, since there are 2 of each. Put that shit all together. You get:

$$SV = \sum_{i=1}^{4} VR_i + h(y+w)(x_1+x_3);\ VR_i = x_i yw$$

Or you could also use:

$$SV = yw\sum_{i=1}^{4} x_i + h(y+w)(x_1+x_3)$$

But fuck that. I'd prefer using the first one, because it's visually better, because we can easily see how it works.

Let me explain this equation for yall dumbasses. The VRi variable represents the volume for each of the 4 rectangular prisms. Since there are 4 of them. I used the mathematical symbol Sigma, not the fucking brainrot term you fucking imbeciles. Thinking of skibidi toilet and the Jonkler right now, aint it? Of course i mean the mathematical one, to represent the sum of the volumes. Aren't every single one of you a disappointment to everyone. Now. with the 4 rectangular prisms, i will give a numerical ID to each volume of each of the rectangular prisms. I decided to give the top rectangular prism, VR1. The one on the right, VR2. Bottom, VR3. And the

left, VR4. Where the fuck did the x1 and x3 come from? Well. Since we gave each VR a number, we know that, to calculate the volume of a rectangular prism. We use the formula `V=xyz`. And since i gave each rectangular prism a numerical ID, so did the x, y, and z variables too. But. this is a 4 dimensional shape. so. the `w` also appears. And since we dont really have a perfect `z` axis line, its replaced by `w`. And the y axis, as we see on the 4 dimensional shape, y is equal everywhere, so there is no y1, y2, etc. Just y. But the same rule still applies. We should get this:

$$VR_1 = x_1yw;\ \ VR_2 = x_2yw;\ \ VR_3 = x_3yw;\ \ VR_4 = x_4yw;$$

And for the formula to not be long, since its the sum, i can use the symbol that represents a sum, Sigma:

$$\sum_{i=1}^{4} VR_i$$

So fucking simple. First half of the equation already explained very well and much like a smart individual. For the other half of the equation, i need to now determine the volume of one of the identical trapezoidal prisms and multiply that by 4. The formula to calculate the volume of a trapezoidal prism is:

$$V = \frac{b+t}{2} \cdot h \cdot W$$

Where b is the length of the base rectangle, t is the length of the top rectangle, h - meaning the height of the trapezoidal prism, and W - meaning the width of the trapezoidal prism. Now. Lets go pay attention on the outer trapezoidal prism for our first pair, because its bigger, easier to see, and easier way on seeing which goes where. If you look at the top rectangle, you can see that the top rectangle is attached to the top rectangular prism, aka, VR1. And the bottom rectangle, is attached to the bottom rectangular prism, aka VR3. so all we need is just the area of those rectangles, and since we have determined the volumes for each of the rectangles, we can go ahead, to both VR1 and VR3, extract the formula for the Area of a rectangle (`A=xy`), and plug that into the volume of a trapezoidal prism formula. And for the other 2 pair, instead of the `y` axis, if we look closely, it uses the `w` axis for its width And, same with the `y` axis, the `w` axis is equal everywhere, so we dont need to give any numerical id to `w`. since we have just 1 value for it. Plug in the `w` axis into the equation. Add the 2 equations. And we should get this:

$$2(\frac{x_1+x_3}{2}) \cdot hy + 2(\frac{x_1+x_3}{2}) \cdot hw$$

As you can see, we can simplify the 2 and the 2 twice:

$$hy(x_1 + x_3) + hw(x_1 + x_3)$$

Factor out `h`:

$$h[y(x_1 + x_3) + w(x_1 + x_3)]$$

Finally, factor out `y+w`. Then we should finally have:

$$h(y + w)(x_1 + x_3)$$

And that, my friends, is my formula for the Surface Volume of a 4 dimensional trapezoid. I call it. **"The ICOSPT Formula"**.
Now for the Hypervolume, if we refer back to the tesseract, the formula for the tesseract's Hypervolume is `x*x*x*x`, and for a 4 dimensional rectangle - `x*y*z*w`. so. i knew that the formula was supposed to be, find the volume of the 3 dimensional version of the shape, and multiply that with `w`. Easy. Keeping the same values, since we're working on the same shape, we get:

$$HV = \frac{x_1 + x_3}{2} \cdot hwy$$

No name for this formula. this just looks fucking common sense and self-explanatory. If it doesnt. Kindly paint your room red with your own brain matter.