

Definition of Math (version 1.0.1)

It would be confusing and also both wrong and pretentious to say that Math is the same as truth.

But it makes perfect sense to say that among all the things we could communicate, Math is very simply the complement of lying. That is, a communication absent of lying is a mathematical communication.

The next few paragraphs here are not necessary for this article and might wreck it, especially because there is already amazingly good consensus for what is and what is not math. But, sometimes, you see in outtakes from movies, an actor who has said something the wrong way, will repeat the wrong sounds a few times just to get it out of his system, and it is necessary a bit to get really close to a specific example of the lying part, which is in some sense the elephant in the room already, just so we can see around it. Pacific island blackbirders

captured tribal leaders and their families and held them hostage until enough able-bodied followers had signed on. Then not infrequently they would deliver the hostages to the sharks and scatter shot at the village to make the place unhealthy for rival recruiters

England, France, Belgium, Holland and other nations with colonies have ...exploited the native colonies of Africa and the East Indies. ... in Africa, subject peoples whose culture does not include money have sometimes been required to pay a money tax. In order to do so they have been forced to work at low wages for white men. Another method of forcing natives to work is to arrest them for "vagrancy."

After emancipation "many Negro men found it hard to find employment, whereas an adult woman in various ways could usually earn a little."

Now, imagine this, in a barroom, a shy figure emerges unexpectedly from a door and begins to dance naked on a table, wearing a tiny belt. People whom she does not know begin to put currency notes into the g string, until it is like a grass skirt, and the figure dancing there for them all, happy and proud for the money.

And imagine also someone taken by surprise, seeing this, talking on the telephone to a friend. And says, "I am seeing two things."

That is the number: two. And this first friend might be only imagining something, only imagining the figure dancing on a table without the skirt of money. And imagining a different table, upon which is stacked the money. And the first friend can count these ideas, as one, two.

One of the aspects of math, which is strange but true, is that once one thing is analyzed, and separated into two things, it is like Humpty Dumpty's shell, where all the king's horses and all the king's men cannot put Humpty together again.

There is not ever, in Math, any way for two ideas which have been perceived as different, ever to be perceived as the same again. In the case of Humpty Dumpty, this is a warning for children about the irreversibility of brain damage, if you carelessly sit on a high wall above bricks. But in math it is something different. There is a different reason why, but two things once they have been perceived as different, remain different forever, whenever they are ever referred to again in any mathematical conversation, between these two friends.

The second friend may gain an impressionistic account of what the friend in the bar is seeing or thinking, but, over the phone, receiving the idea that there are two things here, two different things. And the second friend may ask questions, to try to understand the impression of these two different things. And may for example gather, along the lines of previous conversations, that one of these things is living, and the other one is not living.

So, in the second friend's mind, there are two concepts, the concept of life and death. While, the friend in the bar has the vivid image of the naked dancing figure, and of the money on the table.

In other examples, there can be a whole infinity of concepts transmuted in a math conversation, here there are just two but that is OK. In general as we know, a mathematical conversation can include infinities, things that are curved, that move and interact, waves, things that are found to exist. Strangely, though, each mathematical conversation can be transcribed in one and the same formal language (with admittedly a few subtle variations, but not many known), and once conventions are agreed in simple ways, every theorem of mathematics can be proven by a four or five-line program, such javascript code on a website. It can list in one list, every provable theorem. And the great revelation which one friend might say to another, within the language of mathematics, can be found on that one list, produced by the five line javascript program.

Similar to the story in literature, of monkeys randomly typing, who will without any bound on the amount of time they work, eventually type every English novel which was ever written, this five line program will produce every theorem. A difference is that the monkeys will produce gibberish too, but this five line program will not produce anything except valid proofs.

And then one can ask, where does the creativity come into the story, if people are having a mathematical conversation, such as a series of articles in a journal, leading to a proof of a conjecture? And the answer is that, if we take a statement about infinities, about waves and continuity, and translate it into formal code, that very act of translating has some flexibility. If the statement is provable, we might as well go all the way and translate it into the first statement on the list of theorems, there is no need of the list. And if things are done a convenient way, the first statement on the list can be the empty statement, and so there is nothing that the five line program would have needed to do, which is not done already in the process of writing it down formally, in one particular way.

That is, once the imagination of the two friends who are communicating is taken away, what remains is formal manipulation. I said that lying is not necessarily bad, and here we see that non-mathematical meaning is the same as imagination.

And now, the two, working jointly, can take one of the images, the vivid dancing figure, or the vivid stack of money, and also one of

the concepts of life and death, and say, OK, let's do an experiment together. Is the dancing figure, in your opinion, alive, one will ask.

And the viewer will look at this chimera, this creature, changing, enticing, lying, or whatever, and will look at the money also, and come to a decision, and they will agree then on a value, which will be 'true,' or it will be 'false.'

Duality is the notion that the interaction is symmetric, if we interchange the two friends. The dancing figure, or the concept of life, can be described over the phone, and the mutual decision is made, but there is no need to decide, according to the principle of duality, whether it is that the dancing figure represents life, or whether life represents the dancing figure. The difficult philosophical concept of consciousness is somehow not relevant. The strange paradox, about how my mind is part of the universe, but the universe as far as I know is only a conception, is somehow sidestepped here. Because anyway we can't agree on which is the conception and which is the universe, since there are two conceptions, and presumably one person's conception is the others' universe and vice-versa, or something along those lines.

What is happening is just that truth values arise, very similar to what happens in game theory. But if game theory is misaligned with duality – if there is game theory within the mind of just one player – there are well-known paradoxes.

Sorry to get off the track here, the actual picture is just very easy to see, of two friends talking on the telephone, each with his own concepts, and agreeing, let us say for example, that the dancing figure is alive, but not the money.

Then one might say, 'Hey, I think we can interchange the dancing figure and the money, without interchanging the corresponding concepts of life and death.' And if he said that, he would know he is lying and so would the friend.

I am not saying that lying is bad; without lying, the friend would just be a mirror. And the whole example is contrived in a way because the concept of money is connected with agreements and permissions in other ways, and here the way I was using it, it could be replaced by say marbles or anything else. And the dancing figure could be replaced by anything else, too.

And in fact, in my opinion one thing that really does distinguish living things from non living things is lying, as also does communicating through mathematics.

When Hardy spoke of his conversations with Ramanujan as the only romantic interaction in his life, he didn't mean that he felt towards Ramanujan as one would feel for the dancing figure, if she were dancing out of affection and gazing into one's eyes.

Bers often spoke of the beauty of Teichmuller's ideas, while hating all that Teichmuller represented politically, or as a human being. But he used the word beauty because, similar to falling in love romantically, there is a suspension of all other disbelief. There is a sudden realization, when reading and understanding some mathematical proofs, that you can begin to accept without question anything this person says to you. It is really referring to simple trust, the simple absence of lying, in the case of math. Whereas in the case of a romantic partner it is a matter of trusting a priori, and deciding to make true whatever is said. Whereas, there should be a different word for mathematical beauty as it refers to a trust that concepts will unfold themselves to you in certain writing, and if you get somewhere which you already were trying to go in your own understanding, it will be without any sudden surprises, without any tendentious attempts to change what were your own true goals. And it will be using principles that can henceforth never change, and no one can take them away.

Example of lying.

As a sort of joke, I'm ending up writing this as if it were a math paper, having mentioned something I then turn to its existence.

I forgot to mention something, though, that we can use it sort-of in the same way as a mathematical definition, because we could give various provisional definitions of lying, or we could say we have a personal definition of lying and then using properties of that, we would have personal properties of math, how I'm defining it.

Other things are messed up now, as here I'm talking to 'we' instead of 'you' and duality is messed up too, so many things are messed up here which I am not going to worry about as this is just a rough first draft anyway. But if we said that we are going to give a mathematical definition of lying, or to assume one has somehow been given, then we might say one property of lying is that it is wrong for a judge in a trial to lie to the jury, when the jury is trying to decide, say, whether to put someone to death for a possible murder. This would then mean that he is *only* allowed to make mathematical arguments in his direction to the jury. Note that if a judge says 'He says that *this* happened, and then *that* happened, do you realize that if the estimated probabilities are correct, and the events are independent, the probability of this is less than *one in a billion*???. If he says that, then the content of that assertion is not a lie, even while such statements are known to have been misleading. They are misleading because of the jury's lack of understanding of what is said. The tone of voice of saying *one in a billion* is all they notice, and regardless of whether the definitions I'm considering are sensible or not, they give a way of separating out the math from the non-math, saying that the glaring over the spectacles and saying *one in a billion* sternly or loudly or tendentiously is not part of math, but saying that we're assuming the events to be independent is, if all the definitions associated to a particular flavor of statistics have been studied between the judge and jury. Statistics is a meta-analysis of possible arguments. It is a model of likelihood, and it could lead the judge to make a mathematical statement along the lines that if we define likelihood in such-and-such a way then it is likely that this guy is guilty. For example, the jury could decide to use a model of statistics where the statement 'This guy is likely guilty' is assumed to be true from the start, without any other in-

formation having been added. That is going to seem wrong to a non-mathematician, but a mathematician recognizes it as the same process which convicts anyone.

After a jury has ruled beyond reasonable doubt, the judge usually says to the convict, 'You have done this, and then you have done that, and here is your punishment.' The statements 'you have done this, you have done that,' are never qualified, but it would be nice if after all that, the judge added 'And if I'm wrong, I'm really sorry,' instead of just 'may god have mercy on your soul.'

I still haven't talked about the main point of this section, existence of purely non-lying conversations, and I want to get to that, but I am I guess serendipitously on the topic of lying conversations, so I guess it is time to talk about mathematical models. In a student essay, a student wrote 'as more and more variables are included, the model will eventually explain ...' and it was about explaining animosity between parties in a war. I thought the statement might have been written ironically, as it came after an excruciatingly clear analysis of one of the Rand corporation models, and all the insight seemed suddenly to have disappeared in the last paragraph of that section. The sentence sounded heartless.

The concept of a mathematical model is the notion that after doing a calculation, one 'approximately knows' a real fact, a fact about the real world. The what??? Where does the 'real world' fit into the theory of duality? Oh, I forgot, the good guy on the telephone is the one in the bar, seeing the real world and telling her friend about it. That other guy, that other friend, can only live in the same 'real world.' In the 'real world' there is already life, already death, already money, already dancing figures, and there are facts about them that are just true. The point of math is to get them really accurate. So they can be explained to the other guy. WTF.

Example of math

OK so I just have to give one example, and I'm going to give the example a year stuent reported just a few days ago. I have a much longer example, I have written a thirty-thousand page paper about another example, about the road owner, and I'm thinking of just deleting it, because any example is good enough I guess.

The example here is playstation, and games like Doom, which you have to use as they are made, and which the reader has probably seen. Here however is a photo of a modded game,



it is modded by using the Linux system on playstation 3. This was turned off by the manufacturer in an 'update' over some sort of network, and then some people worked together to find the equation here,

$$\begin{aligned} R &= (mG)_x & R &= (mG)_x \\ S_1 &= \frac{e_1 + kR}{m} & S_2 &= \frac{e_2 + kR}{m} \\ \\ S_1 - S_2 &= \frac{e_1 - e_2}{m} \\ m &= \frac{e_1 - e_2}{S_1 - S_2} \\ k &= \frac{mS_i - e_i}{R} \left[= \frac{e_1 S_2 - e_2 S_1}{R(S_1 - S_2)} \right] \end{aligned}$$

which re-allows games to be modded.

Now, you can ask all the adversaries in the dispute, is this a valid deduction, and they are all going to say, that is not a point of dispute. You can say it's lying to put a huge snowman into the game of doom, because there is not really any giant snowman in the war in the Middle East. The various crimes were recorded as

- Violating the Digital Millennium Copyright Act (17 U.S.C. §1201)
- Violating the Computer Fraud and Abuse Act (18 U.S.C. §1030(a)(2)(c))
- Contributory copyright infringement (17 U.S.C. §501)
- Violating California Data Access and Fraud Act (§502)
- Breach of Contract
- Tortious interference
- Misappropriation
- Trespass

But the equations themselves are just a sort of tautology.

All the math in 'mathematical models' according to this definition, if we agree that it exists as real math, is then not lying. So then, models can't lie, and they are always telling us the truth.

What? Does this mean we have to trust every hokey mathematical model? Can't models be wrong? Answer: Yes you have to trust every hokey mathematical model. Answer: No. the mathematics which you call mathematical models can't be wrong.

What is wrong, in connection with mathematics, is to use this mathematics and to say it is only a 'model.' Mathematics is the process of a full and trusted communication between people. The code of Doom, and the fact that it will create pixels and sound waves in certain ways when the controls are used in certain ways, these are just true things, mathematical things. What is lying, is some other aspects of that video game.

People say that the title character in the film Dr. Strangelove was von Neumann, who had indeed told the Americans that the way to achieve their objectives according to the rules as they stated to him, was to launch an unprovoked attack on the Soviet Union, innocents and guilty alike. Saying, your objectives are equivalent to this. In avoiding 'political correctness' people sometimes resist using the agreed term for things. But in mathematical definitions, it never mattered what terms were used, except some terms are vaguely suggestive of things.

Other examples

Getting back to existence of math, according to the definition I'm suggesting, now, of course I just want to say that besides that one little example, there is also a huge consensus that giant sections of scholarship are agreed to comprise mathematics. And maybe too, that this hasn't been accused of being lying scholarship. There seems to be for some reason a tremendous consensus about what comprises mathematical thought.

Recently some students were wondering why is it that acts of terror are so very rare, it would be so easy for someone to do a terrible thing, but basically it almost never happens. And it seems just to be the way people are, that even with access to weapons millions of times more powerful than what was there when we were evolving and our cognition was being formed, we still so rarely fall victim to the temptation to use them, except when we are organized into groups.

Or, in law, there is no one who gets along saying 'Well, we just never received that letter,' and someone says, 'It was recorded delivery, here is the receipt' and the other person says 'You're just lying.'

That is, there are agreed ways of speaking and acting truthfully and kindly which are just almost universally accepted and understood, and I'm not sure why that is the case. So the question of the existence of mathematical discourse is really answered very soundly.

Mathematical models

I mentioned already, what it means when someone says ‘Well this is only a model,’ and starts to depart from that. Even without the ‘only,’ the concept of a ‘mathematical model’ is a defective one.

Like, a judge in a trial should not produce a plasticine model and say, ‘Well, here is a model of the crime. Here is where he held this knife like this, and did this and did this. It’s only a model of course.’

Or an economist, should not make a model of ‘development.’ and say there is some math here, and on the other hand over here is real life, and I am going to call this math a ‘model’ of real life. No model is perfect, of course, but we agree to disregard the tiny tiny error in the approximation. It is such a tiny number, you can see it now, how many digits it has, of zero, after the decimal point. By disregarding the distinction between this math, which we call a model, and real life, we are going to introduce a lie, but see you can connect this lie to numbers, even to such very tiny numbers. This error, see how tiny it is? A lie cannot hurt you more than this, it is smaller than a fly, so let’s agree to ignore it, OK? And along with this little fly speck, also any other similar things, similar differences, between what I and you are already calling real life, assumed to be a shared concept, and this very true mathematical statement I am calling a model. We don’t know what the differences are, but they are probably tiny fly specks.

We are taking all the things we already accept as part of life, and taking also this true statement of Math, and we are going now to join them together. And for some reason, some little thing is going to be wrong, and we’re going to agree to ignore that little wrong thing. In fact there will be two wrong things, one of them a tiny fly speck, and the other we won’t look at.

So we are appending some new things, which we also agree about, two other things. One of the other things is tiny, so very tiny, we are also going to agree to ignore it.

We could really say, the important things that we’re appending are only these, that is the true statements of the math are already agreed. What we are agreeing to now is two error statements, the measurable error which we agree is tiny, and the other error.

Or, if we aren't measuring, there is the perceived error, and the unperceived error.

It is simply a matter of saying 'All the errors we can perceive are agreed to be acceptable,' if this is the case. If a person or government has taken action affecting lives, in which the errors in the model have been agreed to be acceptable, the lie involves now that the errors we cannot perceive are implicitly decreed to be acceptable, by default.