Do numbers exist?

I would like to discuss the question, whether numbers exist or not. I am going to briefly present well-known philosophical positions on the matter before concluding with some of my own short-sighted thoughts.

The above question is at least 2500 years old as the Greek philosopher Plato has already discussed it. Plato postulated the idea of *Forms* or *Ideas*. A Form is a universal object outside time and space. Every object or quality in our world (tree, red, love, justice, . . .) is actually only an approximation of a Form. Forms are the perfect (thus unchanging) blueprints for every entity. My dog is a particular representation of the ideal Form dog. The Form helps me to understand how I am able to call both mine and the neighbor's dog a dog while at the same time assuming the existence of two different objects (problem of universals).

For Plato, numbers also belong to the realm of Forms. They are objects that just *exist*. When we think of a number, we actually think of a concrete representation of its belonging Form. But that doesn't mean that, for a platonist, numbers don't exist. Numbers exist independently of anything including us.

The theory of nominalism has quite a different view on that question. First of all, there are two different understandings of nominalism: The first movement denies the existence of *universals*, e.g. something that can be instantiated by different entities (a Form as Plato put it). Other nominalists deny the existence of *abstract objects*, which ought to exist outside time and space[1]. As numbers might be seen as universals or abstract objects, arguments against those are in turn arguments against the existence of numbers.

One can argue against universals using the Third-Man-Argument: Assume object O is an instance of Universal U, thus having the quality u. By self-predication, U has the quality u, too. However, if O und U both share the quality u, there must be another universal from which O and U are instantiated. This arguments leads to an infinite number of universals[2].

An argument that is often cited against abstract objects is Ockham's razor[3]. Using this argument, abstract objects aren't necessary if we can show that concrete in lieu of abstract objects can fulfill the theoretical role we associate with the latter. In fact, when calculating "2 x 3", I could easily think of it as "How many apples do I have in my 2 boxes containing 3 apples each?" and thus have no need for an abstract idea of "2" or "3". This approach gets complicated when using more complex (no pun intended!) calculus, though.

Furthermore, as abstract objects are non-spatiotemporal, they don't have causal effects. If so, how are we able to gain a mental representation of an abstract object, say a number? Either we don't have that representation – which is very unintuitive – or there is no such a thing as an abstract object.

For the nominalist, if numbers were to be universals or abstract objects, by consequence they do not exist. From this point of view, numbers may exist, but only as claims (properties) about concrete objects in the real world.

The most radical point of view about the existence of numbers stems from the mathematical fictionalists. They claim that numbers don't exist at all. The main argument behind this

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[1]Depending on the point of view, universals might (*ante rem* realism) or not (*in re* realism) be abstract objects.

[2]For more information, see here.

[3]"Entities should not be multiplied unnecessarily." or, in Newton's wording, "We are to admit no more causes of natural things than such as are both true and sufficient to explain their appearances."

idea goes as follows: If claims like "$2 + 2 = 4$" were to be true, then there must be truly existing objects they are about (e.g. numbers). But these mathematical objects need to be abstract objects (non-spatiotemporal) but abstract objects – says the fictionalist – don't exist. Hence, numbers don't exist.

According to the fictionalists, mathematical claims might be very successful in describing the world. But that doesn't mean they are true. In fact, they can't be true, because they deal with non-existing objects.

Having said this, the question about the existence of numbers seems to boil down to what one understands by "existence". Do abstract objects *really* exist? Is there something other than the sensible world? I personally believe that abstract ideas like justice, relationship, history, languages and numbers *exist*, although I have no idea where and how. In fact, I think the human mind wouldn't be able to cope with this world without somehow accepting their existence.

Even if all that exists was matter or energy (a materialistic view that I don't want to judge), I would argue that numbers are a biochemical configuration of the brain (or any other entity able grasp to the concept of a number). Most probably not the same for everyone, but still existent.

I recently heard about the idea[4] that fictional characters were real because of their impact on the life of an uncounted number of people. Even though this is a day-to-day understanding of the meaning of "exist" or "real", the idea intrigued me. In much the same way, numbers constantly influence – consciously or not – both your and my decisions. There are a lot of choices I try to make based on facts. So for the sake of my mental health, numbers had better exist.

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[4]South Park, *Imaginationland Episode III*, Season 11, Episode 12 ;-)