

# [Philosophy of math](https://assignbuster.com/philosophy-of-math/)

Philosophy of Math Go to the Millennium Prize Problems website--> http www. claymath. org/millennium/ Pick one of the conjectures. Describe it and say (in non-technical terms) why people think it likely true. Use other websites, too, to find less technical descriptions.
" The [Poincare] conjecture says that the three-sphere is the only type of bounded three-dimensional space possible that contains no holes" (Weisstein, 2008). It is possible to stretch a rubber band around an apple and shrink it down to a certain point without breaking the rubber band or the apple, but it is not possible to perform the same action using a doughnut without breaking either it or the rubber band in the process (Clay Mathematics Institute, 2008).
This phenomenon is due to what is known as simple connectivity. The surface of the apple is subject to simple connectivity unlike the surface of the doughnut. " Poincar, almost a hundred years ago, knew that a two dimensional sphere is essentially characterized by this property of simple connectivity, and asked the corresponding question for the three dimensional sphere (the set of points in four dimensional space at unit distance from the origin). This question turned out to be extraordinarily difficult, and mathematicians have been struggling with it ever since" (Clay Mathematics Institute, 2008).
Ornes (2006) finds a way to simply, yet humorously, define the conjecture by saying, " Say you're walking down a street, and you encounter a strange and complicated shape whose surface sports peaks and valleys, mountains and molehills, but no holes. If you were a mathematician, you may want to study the way that functions behave on it. Poincar's conjecture says that no matter what it looks like, it's a sphere. The conjecture gives mathematicians a short and easy way to identify a deformed blob as a sphere in disguise."
(2) Read the article by Colyvan on indispensability of math. You will find it at: http://plato. stanford. edu/entries/mathphil-indis/ . Describe the " indispensability argument" and briefly discuss one objection (ie, state an objection and say why you think it a good one or a poor one.)
According to the Stanford Encyclopedia of Philosophy (2008, pg. 1), " From the rather remarkable but seemingly uncontroversial fact that mathematics is indispensable to science, some philosophers have drawn serious metaphysical conclusions. In particular, Quine and Putnam have argued that the indispensability of mathematics to empirical science gives us good reason to believe in the existence of mathematical entities. According to this line of argument, reference to (or quantification over) mathematical entities such as sets, numbers, functions and such is indispensable to our best scientific theories, and so we ought to be committed to the existence of these mathematical entities. To do otherwise is to be guilty of what Putnam has called 'intellectual dishonesty.'
One objection to the Quine-Putnam argument that has received a great deal of attention is that of Hartry Field. Field argues that mathematics is not indispensable to science, no matter how it may seem at first and he, thus, denies the second premise of the argument. " There are two parts to Field's project. The first is to argue that mathematical theories don't have to be true to be useful in applications, they need merely to be conservative. The second part of Field's program is to demonstrate that our best scientific theories can be suitably nominalised" (Stanford Encyclopedia of Philosophy, 2008, pg. 1). Field brings up some great points here, but he is far from nominalising all of the best existing scientific theories based on his work. However, his work is certainly not trivial and it does have implications for further investigation in the fields of math and science (Stanford Encyclopedia of Philosophy, 2008).
Bibliography
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