Assertion vs Statement

Ask Question

Asked 2 years, 4 months ago Modified 2 years, 4 months ago Viewed 724 times

3

I am not a English native speaker. I apologize if I ask something obvious. According to my knowledge, a *statement* is a sentence about specific numbers, sets or other objects, the sentence being either true or false. So

$3 \times 7 = 11$

is a (false) statement, that continuity does not imply differentiability is a (true) statement, that the polynomial $n^2 + n - 41$ produces prime numbers for all integer values of n from 1 to 40 is a (true) statement and so on.

Nevertheless, (http://strangebeautiful.com/other-texts/geroch-math-assertions.pdf)

> The currency of mathematics is what are called *assertions*. An assertion is a precise, unambiguous, mathematical statement to the effect that something is true (e.g., that some relation between mathematical objects holds; that some object has some property; etc). It isn't necessary, in order to qualify an assertion, that the statement actually *be* true. But it should be the case that the statement is sufficiently clear that it is destined, ultimately, to be found either true or false (as opposed to being vague, or arguable as to meaning). Thus, the phrases that go into assertions are typically those from mathematics, e.g., "there exists one and only one"; "for no x does"; "the collection of all y such that"; "has the property"; "if two mappings from X to Y both satisfy"; "then f is discontinuous on at least seven points of X". Here, for contrast, are some examples of phrases that are rarely found in assertions: "we can find an x with"; "the function f is ambiguous for $x = 6$"; "we cannot add these elements"; "you just do ... and it gives you that"; "we can write"; "Eqns. (6) and (9) are inconsistent".

According to the author that all prime numbers are odd is an assertion.

I am puzzled a bit. Are the words statement and assertion (and the verbs state and assert) interchangeable? Is assertion preferable?

logic terminology

Share Cite Follow

edited Feb 18, 2023 at 23:15

asked Feb 18, 2023 at 22:40

Dimitris

807 6 15

3 A "statement" can, as you say, be true or false. An "assertion" is saying "this statement IS true". In that sense an assertion is stronger than just a statement. – George Ivey Feb 18, 2023 at 23:02

3 Mathematical English has many sets of words used with similar meanings, sometimes with slightly different emphasis such as *theorem/lemma/corollary*. Here you have *statement* and *assertion*, but there are also words like *proposition* and *claim* and *hypothesis* and *conjecture* and more. – Henry Feb 18, 2023 at 23:31

@Henry This question benefits from your comment (which includes George's point) being expanded into an answer! – ryang Feb 19, 2023 at 6:47

@ryang - or perhaps I am expanding the question – Henry Feb 19, 2023 at 12:24

See also this post – Mauro ALLEGRANZA Feb 20, 2023 at 10:08

Add a comment

3 Answers

Sorted by: Highest score (default)

2

There are three distinct concepts to consider. Take the sentence “some elephants can fly.” The grammatical form of this sentence indicates that it is a proposition since it has a truth value, but to assert it is to claim that there really are elephants that can fly. This sentence can be understood as a judgement, i.e. as saying that “some elephants can fly” is true.

To summarize, an assertion claims the reference of sentence, a statement is a sentence with a truth value, and a statement can be judged as true/false.

These concepts have been discussed by the likes of Frege, Russell/Whitehead, Wittgenstein, Kripke, Tarski, and so on. Russell and Frege are probably the most pertinent source to look into for specific references, and the SEP article “Assertion” can give an overview of the full context.

Share Cite Follow

edited Feb 19, 2023 at 3:23

answered Feb 19, 2023 at 0:22

PW_246

1,604 ● 1 ■ 4 ▲ 17

Add a comment

2

Requested in comments:

Mathematical English has many sets of words used with similar meanings, sometimes with slightly different emphasis such as *theorem/lemma/corollary*.

Here you have *statement* and *assertion*, but there are also words like *proposition* and *claim* and *hypothesis* and *conjecture* and more.

Share Cite Follow

answered Feb 19, 2023 at 22:41

Henry

170k ● 10 ■ 138 ▲ 290

Add a comment

0

According to https://abstractmath.org/MM/MMMathEnglish.htm:

> Math English, just like everyday English, is used for making *statements*. Every statement is either true or false. (...)

> Mathematical English also has sentences that are like statements, but may contain variables and may be true or false depending on the values chosen for the variables. In abstractmath.org these are called *assertions*. In particular, any statement is regarded as an assertion with no variables.

> In mathematical logic, statements may be called propositions or sentences and assertions may be called predicates or formulas. I don't use those words because they can cause semantic contamination.

> The words "statement" and "assertion" also have connotations in English that are not relevant here.

> In the abstractmath usage, a statement is simply a sentence that is true or false; it doesn't have to be a witness's report, for example. An assertion is a sentence that becomes true or false when you substitute values for the variables. It doesn't have to be emphatic.

Share Cite Follow

answered Feb 20, 2023 at 10:10

Dimitris

807 6 ▲15

The author hasn't thoroughly thought through their position: in particular, it's odd to be distinguishing between open formulae and closed formulae by calling them "assertions" and "statements", respectively. – ryang Feb 20, 2023 at 12:31

Add a comment

You must log in to answer this question.

Start asking to get answers

Find the answer to your question by asking.

Ask question

Explore related questions

logic terminology

See similar questions with these tags.