

Quiz 1 - Math 374, Frank Thorne (thorne@math.sc.edu)

Wednesday, January 21, 2015

- (1) Copy the two statements below with blanks onto your paper. Then, fill in the blanks to rewrite the following statement:

The reciprocal of any positive real number is positive.

- (a) For any real number r , if r is _____, then _____.
(b) Given any positive real number r , the reciprocal of _____.

Solutions.

- (a) For the first blank, the best answer is 'positive'. You can also say 'a positive real number', although this is redundant.

For the second blank, the best answer is 'the reciprocal of r is positive'. You can also say 'its reciprocal is positive'; this is completely correct, although it is slightly preferable from the standpoint of formal logic to use variable names when available.

Some answers included the word 'also', which is fine.

Other correct answers are ' $1/r$ is positive' or ' r has a reciprocal which is positive'. These are fine, although in general it is good practice to stick as closely to the wording of the original statement as possible. (However, the latter answer recognizes that not every real number has a reciprocal, even though every positive real number does!)

I marked off one point for 'the reciprocal is positive'. This is basically correct – but what reciprocal? It is best to make this unambiguous.

- (b) Correct answers include ' r is positive' and ' r is also positive'. (This question did not yield diverse answers.)

- (2) Answer yes or no (you do not need to explain your answers):

- (a) Is $1 \in \{1\}$?
(b) Is $\{2\} \subseteq \{1, \{2\}, \{3\}\}$?
(c) Is $\{1\} \subseteq \{1, 2\}$?
(d) Is $1 \in \{\{1\}, 2\}$?

- (a) Yes. 1 is indeed an element of the right set.
(b) No. The question asks whether 2 (i.e., every element of $\{2\}$, and there is only one) is an element of the set on the right. It is not, although $\{2\}$ is.
(c) Yes. The question asks whether 1 (i.e., every element of $\{1\}$, and there is only one) is an element of the set on the right. It is.
(d) No. 1 is not an element of the set on the right, although $\{1\}$ is.