

Quiz: August 16

This is a closed-book quiz, and no team-work or reference materials are permitted.

- (1) Write a negation of the following:

Some basketball players at Earlham College are short.

- (2) Write a negation of each of the following in words and in symbols:

- There exists a natural number n such that $3n$ is divisible by 6.
- If p is an integer, then so is $p/2$.

Solution

- (1) All basketball players at Earlham College are tall.

In symbols (if you insist!): $(\forall x \in ECB) (x \in T)$

where ECB is the set of all basketball players at EC, and T is the set of all tall people.

Remark: Here we're assuming "tall" has the same meaning as "not short." Clearly, this is not always true in everyday, spoken English. For example, if I say "She is not a short lady," you won't necessarily conclude she is tall.

- (2) a. Words: For every natural number n , $3n$ is NOT divisible by 6.

OR

There is no natural number n such that $3n$ is divisible by 6.

Symbols: $(\forall n \in \mathbb{N}) (\frac{3n}{6} \notin \mathbb{N})$

- b. Words: There exists an integer p such that $p/2$ is not an integer.

Remark: While it is okay if your answer says: " p is an integer and $p/2$ is not an integer," the above answer is clearer and more precise.

Symbols: $(\exists p \in \mathbb{Z}) (p/2 \notin \mathbb{Z})$ OR $(p \in \mathbb{Z}) (p/2 \notin \mathbb{Z})$

Grading: Total points possible = 5.

1pt for any reasonable effort.

1 pt for (1): No partial credit – either it is correct, or it is not!

3 pt for (2): 1.5pt for each of (a) and (b).

1pt + 0.5pt = correct words + correct symbols
(or other way round, if that yields higher score).