

Solutions

QUIZ 2, repeat

For questions 1-4:

The universe of discourse for variable x is all students at ODU.

The universe of discourse for variable y is the following set of games:

{soccer, tennis, baseball, chess, poker}

The predicate $T(x,y)$ means "x plays y."

For each of the English language statements given in questions 1-4, write an equivalent symbolic statement using quantifiers

- 1 pt. 1. There is no game that is played by every student.

$$\neg \exists y \forall x T(x,y)$$

- 1 pt. 2. Every student plays at least one game.

$$\forall x \exists y T(x,y)$$

- 1 pt. 3. No students play both tennis and baseball.

$$\neg \exists x (T(x, \text{tennis}) \wedge T(x, \text{baseball}))$$

- 1 pt. 4. At least two students play chess.

Let z be a variable with the same universe of discourse as x .

$$\exists x \exists z (T(x, \text{chess}) \wedge T(z, \text{chess}))$$

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- 2 pts. 5. Suppose x is a variable whose universe of discourse is all positive integers. The predicate $Q(x)$ means " $x+1 = 2x$." What are the truth values of the following propositions:

(a) $\forall x Q(x)$ False

(b) $\exists x Q(x)$ True