M325K

HW #3, SECTION 3.3 SOL'NS SPRING 2024

Section 3.3

#2.

a) $G(2,3) =$ "$2^2 > 3$" TRUE

b) $G(1,1) =$ "$1^2 > 1$" FALSE

c) $G(\frac{1}{2}, \frac{1}{2}) =$ "$(\frac{1}{2})^2 > \frac{1}{2}$" FALSE

d) $G(-2, 2) =$ "$(-2)^2 > 2$" TRUE

Sec 3.3 #10, a) The ~~statement~~ statement means:
"Given any student, that student has chosen some dessert."
This is true:
Every student chose some dessert.

#10, b) ~~The~~ statement means:
"Given any student, that student has chosen some salad."
which is equivalent to:
"Every student chose a salad."

This is false. Yuen did not choose any salad.

#10 c) The statement means:
"There is a dessert that all students chose."
This is true. Every student chose the dessert "pie".

[ONLY b, d, e were assigned]

#11 a) There is a student who has seen "Casablanca".

b) All students have seen "STAR WARS".

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#11 (Continued)

c) Every student has seen some movie.

d) There is a movie that everyone has seen.

e) There are two distinct students who have seen the same movie.

f) There are two students such that the second student has seen every movie that the first student has seen.

#12 $D = E = \{-2, -1, 0, 1, 2\}$

a) $S =$ "$\forall x$ in D, $\exists y$ in E such that $x+y=1$."
$\sim S =$ "$\exists x$ in D such that $\forall y$ in E, $x+y \neq 1$."
$\sim S$ is true with $x=-2$.

b) $S =$ "$\exists x$ in D such that, $\forall y$ in E, $x+y=-y$."
$\sim S =$ "$\forall x \in D$, $\exists y$ in E such that $x+y \neq -y$."
$\sim S$ is True.

c) $S =$ "$\forall x$ in D, $\exists y$ in E such that $xy \geq y$" S is True, Take $y=0$.
$\sim S =$ "$\exists x$ in D such that $\forall y$ in E, $xy < y$."

d) $S =$ "$\exists x$ in D such that $\forall y$ in E, $x \leq y$." S is True: $x=-2$.
$\sim S =$ "$\forall x$ in D, There exists y in E such that $x > y$."

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#41, c. $S =$ " $\exists x \in \mathbb{R}$ such that $\forall y \in \mathbb{R}$, $x \neq y+1$."

This is false because its negation is True.

$\sim S =$ " $\forall x \in \mathbb{R}$, $\exists y \in \mathbb{R}$ such that $x \neq y+1$ " True. For each x, let $y = x-2$.

#41 g: $\forall x \in \mathbb{Z}$ and $\forall y \in \mathbb{Z}$, $\exists z \in \mathbb{Z}$ such that $z = x-y$.

This is true. The difference of any two integers is another integer.