

## 338.001, VL Logic, Martina Seidl / Wolfgang Schreiner / Wolfgang Windsteiger, 2022W

Dashboard / My courses / 2022W338001 / Module FOA: First-Order Logic - Syntax, Semantics, and Pragmatics / FOA2Q

## Quiz navigation



Show one page at a time

Finish review

Started on	Monday, 21 November 2022, 7:18 PM
State	Finished
Completed on	Monday, 21 November 2022, 7:31 PM
Time taken	13 mins 58 secs
Grade	4.0 out of 5.0 (80%)

## Question 1

Correct

Mark 3.0 out of 3.0

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In the following, we interpret formulas over the finite domain  $\{0, 1, 2\}$  with the usual interpretations of the various symbols.

1. Mark all assignments  $\langle x, y \rangle$  of values to  $x$  and  $y$  that make the following formula true:

$$x > 0 \vee x \leq y$$

☒  $\langle 0, 0 \rangle$  ✓ ☒  $\langle 0, 1 \rangle$  ✓ ☒  $\langle 0, 2 \rangle$  ✓ ☒  $\langle 1, 0 \rangle$  ✓ ☒  $\langle 1, 1 \rangle$  ✓ ☒  $\langle 1, 2 \rangle$  ✓ ☒  $\langle 2, 0 \rangle$  ✓ ☒  $\langle 2, 1 \rangle$  ✓ ☒  $\langle 2, 2 \rangle$  ✓ ☐ none

Mark 2.0 out of 2.0

The correct answer is:

- $\langle 0, 0 \rangle$
- $\langle 0, 1 \rangle$
- $\langle 0, 2 \rangle$
- $\langle 1, 0 \rangle$
- $\langle 1, 1 \rangle$
- $\langle 1, 2 \rangle$
- $\langle 2, 0 \rangle$
- $\langle 2, 1 \rangle$
- $\langle 2, 2 \rangle$

2. Mark all assignments of values to  $x$  that make the following formula true:

$$x > 0 \vee \forall y : x \leq y$$

☒ 0 ✓ ☒ 1 ✓ ☒ 2 ✓ ☐ none

Mark 1.0 out of 1.0

The correct answer is:

- 0
- 1
- 2

3. Is the following formula true or false?

$$\forall x : (x > 0 \vee \forall y : x \leq y)$$

☒ true ✓ ☐ false

Mark 1.0 out of 1.0

The correct answer is: true

## Question 2

Incorrect

Mark 0.0 out of 1.0

Flag question

Consider the following formula where the outermost logical connective is "negation":

$$\neg \forall x : ((\exists y : q(y, x)) \rightarrow (p(x) \vee \exists y : (p(y) \wedge q(x, y))))$$

Which of the following formulas (where only atomic formulas are negated) is logically equivalent to this formula?

Select one:

- ☐ a.  $\exists x : ((\exists y : q(y, x)) \wedge (\neg p(x) \wedge \forall y : (\neg p(y) \vee \neg q(x, y))))$
- ☐ b.  $\exists x : ((\forall y : \neg q(y, x)) \wedge (\neg p(x) \wedge \forall y : (\neg p(y) \vee \neg q(x, y))))$
- ☐ c.  $\exists x : ((\exists y : q(y, x)) \wedge (\neg p(x) \vee \exists y : (p(y) \wedge q(x, y))))$
- ☐ d.  $\exists x : ((\exists y : q(y, x)) \wedge (\neg p(x) \wedge \forall y : (p(y) \wedge \neg q(x, y))))$
- ☒ e.  $\exists x : ((\forall y : \neg q(y, x)) \rightarrow (\neg p(x) \wedge \forall y : (\neg p(y) \vee \neg q(x, y))))$  ✗
- ☐ f. None

**Question 3**

Correct

Mark 1.0 out of 1.0

[Flag question](#)

Die Antwort ist falsch.

The correct answer is:  $\exists x : ((\exists y : q(y, x)) \wedge (\neg p(x) \wedge \forall y : (\neg p(y) \vee \neg q(x, y))))$ Consider the following two formulas interpreted over the domain  $\{1,2\}$ :

$$\forall x: (p(x) \vee q(x))$$

$$(\forall x: p(x)) \vee (\forall x: q(x))$$

For which definition of  $p$  and  $q$  is the first formula "true" and the second formula "false"?

Select one:

- ☐ a.  $p(1)=\text{true}, p(2)=\text{true}; q(1)=\text{false}, q(2)=\text{false}$
- ☐ b.  $p(1)=\text{true}, p(2)=\text{false}; q(1)=\text{true}, q(2)=\text{false}$
- ☐ c.  $p(1)=\text{true}, p(2)=\text{true}; q(1)=\text{true}, q(2)=\text{false}$
- ☒ d.  $p(1)=\text{true}, p(2)=\text{false}; q(1)=\text{false}, q(2)=\text{true}$  ✓
- ☐ e. None

Die Antwort ist richtig.

The correct answer is:  $p(1)=\text{true}, p(2)=\text{false}; q(1)=\text{false}, q(2)=\text{true}$ [Finish review](#)[FOA2B](#)

Jump to...

[FOA3B](#)