Exercise: Predicate Logic

- **วิชชาภัทร จินดานาถ** previously submitted answers to this quiz/test on 18-Oct-2023 @ 02:06:51 and obtained **18** correct answers out of **18** .
- This test/quiz can be taken many times.
- Correct answers will NOT be revealed after submission.

Answer all the questions correctly wihtin the deadline of this module. You can submit the answers as many times as you wish.

1 Use this information to answer Question 1-5
Let

- P(x) denote the statement "x > 0"
- Q(x) denote the statement "x < 0"
- R(x) denote the statement "x = 0"
- S(x, y) denote the statement "x + y = 2"

What are these truth values when the domain of x is a set of real numbers?
∀xP(x)

From previous attempt

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2 What are these truth values when the domain of x is a set of real numbers?
∃!xP(x)

From previous attempt

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3 What are these truth values when the domain of x is a set of real numbers?
∀x((P(x) ∧ Q(x)) → R(x))

From previous attempt

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4 What are these truth values when the domain of x is a set of real numbers?
$\forall x \exists y S(x,y)$

From previous attempt

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5 What are these truth values when the domain of x is a set of real numbers?
$\exists x \forall y S(x,y)$

From previous attempt

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6 Use this information to answer Question 6-8
Let P(x, y) denote the statement "x joins y class"
Q(x) denote the statement "x likes studying math"
When the domain of x is a set of students in ABC university, and the domain of y is a set of classes in ABC university.
Express each statement in terms of quantifier:
Every student who joins DISCRETE class like studying math

From previous attempt

- $\forall x(P(x,\text{DISCRETE}) \rightarrow Q(x))$
- $\forall x(P(x,\text{DISCRETE}) \wedge Q(x))$

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7 Express each statement in terms of quantifier:
There is a student who neither join DISCRETE class nor DIG LOGIC class

From previous attempt

- $\exists x(\neg(P(x,\text{DISCRETE}) \wedge P(x,\text{DIG LOGIC})))$
- $\exists x(\neg(P(x,\text{DISCRETE}) \vee P(x,\text{DIG LOGIC})))$

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8 Express each statement in terms of quantifier:
There is a student who does not join any class.

From previous attempt

- $\neg \exists x \forall y P(x,y)$
- $\exists x \forall y(\neg P(x,y))$

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9 Determine the truth value of these statements
If $\forall x P(x)$ is true when $x \in R$ then $\forall x P(x)$ is always true when $x \in I$

From previous attempt

10 Determine the truth value of these statements
If $\exists xP(x)$ is true when $x \in R$ then $\exists xP(x)$ is always true when $x \in I$

From previous attempt

11 Determine the truth value of these statements
$\exists xP(x)$ is true when $x \in \varnothing$

From previous attempt

12 Use this information to answer Question 12-14
Let P(x), Q(x) is the value of the propositional function at x and A is a proposition
Answer the following questions $\forall xP(x) \rightarrow A \equiv$?

From previous attempt

- $\forall x(P(x) \rightarrow A)$
- $\exists x(P(x) \rightarrow A)$

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13 $\forall x(P(x) \vee Q(x)) \equiv \forall xP(x) \vee \forall xQ(x)$

From previous attempt

14 Determine whether it is valid.
Premise:

From previous attempt

- $(p \vee \neg q) \rightarrow \neg r$
- $p \wedge q$
- $s \rightarrow r$

1.1. Conclusion: $\neg s$
1.2. Conclusion: $q \rightarrow r$

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15 Identify the error or errors in this argument that supposedly shows that if $\exists xP(x) \wedge \exists xQ(x)$ is true then $\exists x(P(x) \wedge Q(x))$ is true.

From previous attempt

1. $\exists xP(x) \wedge \exists xQ(x)$ Premise

2. ∃xP(x) _____ from (1)
3. P(c) Existential instantiation from (2)
4. ∃xQ(x) Simplification from (1)
5. Q(c) Existential instantiation from (4)
6. P(c) ∧ Q(c) _____ from (3) and (5)
7. ∃x(P(x) ∧ Q(x)) Existential generalization

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16 From 15 which rule of inference are used for step 2 and step 6

From previous attempt

17 Which conclusion can we obtain from the argument (Hint: the domain of x is DS-TA)?

Premise:

From previous attempt

- Every DS-TA either enjoys drinking frappe or enjoys drinking tea
- Every DS-TA either enjoys drinking coffee or does not enjoy drinking tea
- Every DS-TA who enjoys drinking milk does not enjoy drinking coffee
- Some DS-TA do not enjoy drinking frappe

Conclusion: Every DS-TA do not enjoy drinking milk

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18 From 17, Conclusion: Some DS-TA who enjoy drinking tea, enjoy drinking coffee

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From previous attempt

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Previous (?q=onlinecourse/theatre/27024/iTu3eZT8KgW3)

Version 1.15.23.2

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