Assignment 2

The due date for submitting this assignment has passed. Due on 2019-02-13, 23:59 IST.
As per our records you have not submitted this assignment.

1) Which of the following statements has the truth value TRUE, where the domain for all variables consists of all integers?
   a. $\exists n \exists m \,(n^2 + m^2 = 6)$
   b. $\exists n \exists m \,(n + m = 4 \land n - m = 1)$
   c. $\forall n \exists m \,(n^2 + m^2 = 5)$
   d. $\exists n \exists m \,(n^2 + m^2 = 5)$

   No, the answer is incorrect.
   Score: 0
   Accepted Answers: d

2) Let $P(x)$ denote the statement 
   “$2^x > 1!$”. Which of these have the truth value TRUE?
   (i) $P(0)$
   (ii) $P(4)$
   (iii) $P(1)$
   (iv) $P(5)$

   a. (iv) only
   b. (iii) only
   c. All of the above
   d. None of the above

   No, the answer is incorrect.
   Score: 0
Let $P(x)$ be the statement “$x = x^2$”. If the domain consists of all integers, which of the following statements has the truth value FALSE?

a. $P(0)$
b. $P(1)$
c. $\exists x \ P(x)$
d. $\forall x \ P(x)$

No, the answer is incorrect.
Score: 0
Accepted Answers: 
d

4)
Let $Q(x, y)$ be the statement “$x + y = x - y$”. If the domain for both variables consists of integers, which of the following statements has the truth value TRUE?

a. $\forall y \ Q(1, y)$
b. $Q(1, 1)$
c. $\exists y \ \forall x \ Q(x, y)$
d. $\forall y \ \exists x \ Q(x, y)$

No, the answer is incorrect.
Score: 0
Accepted Answers: 
c

5)
Let $A = \{1, 2, 3, 4, 5\}$. Determine which of the following statements give the truth value TRUE.

(i) $\exists x \in A \ (x + 3 = 10)$
(ii) $\forall x \in A \ (x + 3 < 10)$
(iii) $\exists x \in A \ (x + 3 < 5)$
(iv) $\forall x \in A \ (x + 3 \leq 7)$

a. (i) and (ii).
b. (ii) and (iii).
c. (iii) and (iv).
d. (i) and (iv).

No, the answer is incorrect.
Score: 0
Accepted Answers: 
b

6)
Find a counter example for the statement $\forall x \ (|x| = x)$ where $x \in A$ and $A = \{-1, 1, 2, 3\}$

a. 3 is a counter example.
b. -1 is a counter example.
c. The statement is TRUE, hence there is no counter example.
d. None of the above.

No, the answer is incorrect.
Score: 0
Accepted Answers:
b

?)
Find a counter example of $\forall x \ \forall y \ (xy > y)$, where the domain for all variables consists integers.

a. $x = -7$, $y = 8$
b. $x = -7$, $y = -8$
c. $x = 2$, $y = 3$
d. The statement is TRUE, hence there is no counter example.

No, the answer is incorrect.
Score: 0
Accepted Answers:
a

Let $T(x)$ be the statement “$x$ is a tautology”. If the domain consists of all the declar sentences, the statement “the conjunction of two tautologies is a tautology” can be expressing logical operators, predicates, and quantifiers as

a. $\forall x \ \forall y \ (T(x) \land T(y))$
b. $\forall x \ \forall y \ T(x \land y)$
c. $\forall x \ \forall y \ ((T(x) \land T(y)) \rightarrow T(x \land y))$
d. $\forall x \ \forall y \ (T(x \land y) \rightarrow (T(x) \land T(y)))$

No, the answer is incorrect.
Score: 0
Accepted Answers:
c
The statement, “Every learner is studious” where \( L(x) \) is “\( x \) is a learner” and \( S(x) \) is “\( x \) is studious” and the domain consists of all people, can be expressed as:

a. \( \exists x (L(x) \land S(x)) \)

b. \( \forall x (L(x) \land S(x)) \)

c. \( \exists x (L(x) \rightarrow S(x)) \)

d. \( \forall x (L(x) \rightarrow S(x)) \)

No, the answer is incorrect.
Score: 0
Accepted Answers:
\( \square d \)

10)
“The product of two negative real numbers is not negative” can be expressed as:

a. \( \exists x \forall y ((x < 0) \land (y < 0) \rightarrow (xy > 0)) \)

b. \( \exists x \exists y ((x < 0) \land (y < 0) \land (xy > 0)) \)

c. \( \forall x \exists y ((x < 0) \land (y < 0) \land (xy > 0)) \)

d. \( \forall x \forall y ((x < 0) \land (y < 0) \rightarrow (xy > 0)) \)

No, the answer is incorrect.
Score: 0
Accepted Answers:
\( \square d \)

11)
Determine the truth value of each of these statements if the domain consists of all integers

(i) \( \forall n (n + 1 > n) \)

(ii) \( \exists n (2n = 3n) \)

(iii) \( \exists n (n = -n) \)

(iv) \( \forall n (3n \leq 4n) \)

a. Only (i), (ii), and (iii) are TRUE.

b. Only (i) and (iv) are TRUE.

c. All are TRUE.

d. All are FALSE.

No, the answer is incorrect.
Score: 0
Accepted Answers:
\( \square a \)
Let $C(x)$ be the statement “$x$ is in your class” and $H(x)$ be the statement “$x$ can speak Hindi in the domain consists of all people, the statement “Everyone in your class can speak Hindi” be expressed using logical operators, predicates, and quantifiers as

a. $\forall x \, H(x)$

b. $\forall x \, (C(x) \land H(x))$

c. $\forall x \, (C(x) \rightarrow H(x))$

d. $\forall x \, (H(x) \rightarrow C(x))$

No, the answer is incorrect.
Score: 0
Accepted Answers:
c

13) The negation of the statement $\forall x \, \exists y \, (P(x, y) \rightarrow Q(x, y))$ can be expressed using logical operators, predicates, and quantifiers as

a. $\exists x \, \forall y \, (P(x, y) \lor \neg Q(x, y))$

b. $\exists x \, \forall y \, (P(x, y) \land \neg Q(x, y))$

c. $\exists x \, \forall y \, (P(x, y) \rightarrow Q(x, y))$

d. $\forall x \, \exists y \, (\neg P(x, y) \rightarrow \neg Q(x, y))$

No, the answer is incorrect.
Score: 0
Accepted Answers:
b

14) The negation of the statement “some students dislike cricket” is

a. Some students like cricket

b. Every student dislikes cricket

c. Every student likes cricket

d. None of these

No, the answer is incorrect.
Score: 0
Accepted Answers:
c

15)
Let $M(x, y)$ be the statement “$x$ has sent $y$ an e-mail message” and $T(x, y)$ be the statement “$x$ has telephoned $y$”, where the domain consists of all students in your class. The statement “Everyone in your class has either telephoned $A_{vi}$ or sent him an e-mail message” can be expressed using logical operators, predicates, and quantifiers as

a. $\forall x (T(x, A_{vi}) \land \neg M(x, A_{vi})) \lor (\neg T(x, A_{vi}) \land M(x, A_{vi}))$

b. $\forall x (T(x, A_{vi}) \lor M(x, A_{vi}))$

c. $\forall x (T(x, A_{vi}) \land \neg M(x, A_{vi}))$

d. $\forall x (\neg T(x, A_{vi}) \land M(x, A_{vi}))$

No, the answer is incorrect.
Score: 0
Accepted Answers:
a