Score: **108.35** out of 160 points (67.72%)

1. award:
0 out of 2.71 points

The negation of the statement "Kwame will take a job in industry or go to graduate school." using De Morgan's law is "Kwame will not take a job in industry or will not go to graduate school."

- (selected, incorrect) True
- False

The negation of the statement "Kwame will take a job in industry or go to graduate school." using De Morgan's law is "Kwame will not take a job in industry and will not go to graduate school."

True / False	Chapter: 01 The Foundations: Logic and Proofs	Section: 01.03 Propositional Equivalences

2. award:
0 out of 2.71 points

Find the negation of the statement "Yoshiko knows Java and calculus" using De Morgan's law.

- (selected, incorrect) Yoshiko does not know Java and does not know calculus.
- Yoshiko knows Java and does not know calculus.
- → Yoshiko does not know Java or does not know calculus.
- Yoshiko knows Java or knows calculus.

The De Morgan law to be used is $\neg(p \wedge q) \equiv \neg p \vee \neg q$.

Multiple Choice	Chapter: 01 The Foundations: Logic and Proofs	Section: 01.03 Propositional Equivalences

3. award:
0 out of 2.71 points

The negation of the statement "James is young and strong" using De Morgan's law is "James is not young, or he is not strong."
Is it true?

- Yes
- (selected, incorrect) No

The negation of the statement "James is young and strong" using De Morgan's law is "James is not young, or he is not strong."

Yes / No	Chapter: 01 The Foundations: Logic and Proofs	Section: 01.03 Propositional Equivalences

4. award:
0 out of 2.71 points

Find the negation of the statement "Rita will move to Oregon or Washington" using De Morgan's law.

- (selected, incorrect) Rita will not move to Oregon or will not move to Washington.
- Rita will move to Oregon and will not move to Washington.
- → Rita will not move to Oregon and will not move to Washington.
- Rita will not move to Oregon or will move to Washington.

The De Morgan's Law used is $\neg(p \vee q) \equiv \neg p \wedge \neg q$.

Multiple Choice	Chapter: 01 The Foundations: Logic and Proofs	Section: 01.03 Propositional Equivalences

5. award:
2.71 out of 2.71 points

The truth table of the conditional statement, $(p \wedge q) \rightarrow p$ is,

p	q	$p \wedge q$	$(p \wedge q) \rightarrow p$
T	**T**	**T**	**T**
T	**F**	**F**	**F**
F	**T**	**F**	**T**
F	**F**	**F**	**F**

Is the conditional statement $(p \wedge q) \rightarrow p$ a tautology?

- Yes
- (selected, correct) No

The actual truth table of the conditional statement, $(p \wedge q) \rightarrow p$ is,

p	q	$p \wedge q$	$(p \wedge q) \rightarrow p$
T	**T**	**T**	**T**
T	**F**	**F**	**T**
F	**T**	**F**	**T**
F	**F**	**F**	**T**

Yes / No	Chapter: 01 The Foundations: Logic and Proofs	Section: 01.03 Propositional Equivalences

6. award:
2.71 out of
2.71 points

Identify the missing truth values from the following truth table of the conditional statement $p \rightarrow (p \vee q)$.

p	q	$p \vee q$	$p \rightarrow (p \vee q)$
T	**T**		**T**
T	**F**		**T**
F	**T**		**T**
F	**F**		**T**

(selected, correct)

$p \vee q$
T
T
T
F

$p \vee q$
F
T
T
F

$p \vee q$
T
F
T
F

$p \vee q$
T
F
F
F

7. award:
2.71 out of
2.71 points

The following truth table of the conditional statement $\neg p \rightarrow (p \rightarrow q)$ is tautology.

p	q	$\neg p$	$p \rightarrow q$	$\neg p \rightarrow (p \rightarrow q)$
T	**T**	**F**	**T**	**T**
T	**F**	**F**	**F**	**T**
F	**T**	**T**	**T**	**T**
F	**F**	**T**	**A**	**T**

In the above truth table the truth value of variable **A** is ______.

T

8. award:
2.71 out of
2.71 points

In the following truth table the truth value of the conditional statement $(p \wedge q) \rightarrow (p \rightarrow q)$ of missing term is ______.

p	q	$p \wedge q$	$p \rightarrow q$	$(p \wedge q) \rightarrow (p \rightarrow q)$
T	**T**	**T**	**T**	**T**
T	**F**	**F**	**F**	**T**
F	**T**	**F**	**T**	**T**
F	**F**		**T**	**T**

F

9. award:
2.71 out of
2.71 points

Is all the truth values of the following truth table of the conditional statement $\neg(p \rightarrow q) \rightarrow p$ represents tautology is correct.

p	q	$p \rightarrow q$	$\neg(p \rightarrow q)$	$\neg(p \rightarrow q) \rightarrow p$
T	**T**	**T**	**F**	**T**
T	**F**	**F**	**T**	**T**
F	**T**	**T**	**F**	**T**
F	**F**	**T**	**F**	**T**

- (selected, correct) Yes
- No

10. award:
0 out of
2.71 points

Identify the missing truth values from the following truth table of the conditional statement $\neg(p \to q) \to \neg q$.

p	q	$p \to q$	$\neg(p \to q)$	$\neg q$	$\neg(p \to q) \to \neg q$
T	**T**		**F**	**F**	**T**
T	**F**		**T**	**T**	**T**
F	**T**		**F**	**F**	**T**
F	**F**		**F**	**T**	**T**

→

$p \to q$
T
F
T
T

$p \to q$
T
T
T
T

$p \to q$
T
F
F
T

$p \to q$
F
F
T
T

11. award:
2.71 out of
2.71 points

Complete the truth table given below to verify the equivalence of p and $p \wedge$ **T**.

p	$p \wedge$ **T**
T	T
F	F

Worksheet	Chapter: 01 The Foundations: Logic and Proofs	Section: 01.03 Propositional Equivalences

Complete the truth table given below to verify the equivalence of p and $p \wedge$ **T**.

p	$p \wedge$ **T**
T	*T*
F	*F*

Explanation:

The output of the given truth table is,

p	$p \wedge$ **T**
T	**T**
F	**F**

12. award:
1.36 out of 2.71 points

Complete the truth table given below to verify the equivalence of $p \vee \mathbf{F}$ and p.

$p \vee \mathbf{F}$	p
T	**T** ✔
F	**T** ✘

Worksheet	Chapter: 01 The Foundations: Logic and Proofs	Section: 01.03 Propositional Equivalences

Complete the truth table given below to verify the equivalence of $p \vee \mathbf{F}$ and p.

$p \vee \mathbf{F}$	p
T	*T*
F	*F*

Explanation:

The output is as follows:

$p \vee \mathbf{F}$	p
T	**T**
F	**F**

13. award:
1.36 out of 2.71 points

Complete the following truth table to verify the equivalence of $p \wedge \mathbf{F}$ and p.

$p \wedge \mathbf{F}$	p
F	**F** ✘
F	**F** ✔

Worksheet	Chapter: 01 The Foundations: Logic and Proofs	Section: 01.03 Propositional Equivalences

Complete the following truth table to verify the equivalence of $p \wedge \mathbf{F}$ and p.

$p \wedge \mathbf{F}$	p
F	*T*
F	*F*

Explanation:

The output of the given truth table is:

$p \wedge \mathbf{F}$	p
F	**T**
F	**F**

Hence $p \wedge \mathbf{F}$ and p are not equivalent.

14. award:
1.36 out of 2.71 points

Complete the following truth table to verify the equivalence of $p \vee \mathbf{T}$ and p.

$p \vee \mathbf{T}$	p
T	**T** ✔
T	**T** ✘

Worksheet	Chapter: 01 The Foundations: Logic and Proofs	Section: 01.03 Propositional Equivalences

Complete the following truth table to verify the equivalence of $p \vee \mathbf{T}$ and p.

$p \vee \mathbf{T}$	p
T	*T*
T	*F*

Explanation:

The output of the given table is:

$p \vee \mathbf{T}$	p
T	**T**
T	**F**

Hence, $p \vee \mathbf{T}$ and p are not equivalent.

15. award:
2.71 out of 2.71 points

Complete the following truth table to verify the equivalence of *p* and *p* ∨ *p*.

p	*p* ∨ *p*
T	**T**
F	**F**

Worksheet Chapter: 01 The Foundations: Logic and Proofs Section: 01.03 Propositional Equivalences

Complete the following truth table to verify the equivalence of *p* and *p* ∨ *p*.

p	*p* ∨ *p*
T	*T*
F	*F*

Explanation:

The out put of the given truth table is:

p	*p* ∨ *p*
T	**T**
F	**F**

Hence, *p* and *p* ∨ *p* are equivalent.

16. award:
2.71 out of 2.71 points

Complete the following truth table to verify the equivalence of *p* and *p* ∧ *p*.

p	*p* ∧ *p*
T	**T**
F	**F**

Worksheet Chapter: 01 The Foundations: Logic and Proofs Section: 01.03 Propositional Equivalences

Complete the following truth table to verify the equivalence of *p* and *p* ∧ *p*.

p	*p* ∧ *p*
T	*T*
F	*F*

Explanation:

The output of the given truth table is:

p	*p* ∧ *p*
T	**T**
F	**F**

Hence, *p* and *p* ∧ *p* are equivalent.

17. award: **2.71 out of 2.71 points**

Complete the truth table given below to verify the associative laws.

p	*q*	*r*	*p* ∨ *q*	(*p* ∨ *q*) ∨ *r*	*q* ∨ *r*	*p* ∨ (*q* ∨ *r*)
T	**T**	**T**	**T**	**T**	**T**	**T**
T	**T**	**F**	**T**	**T**	**T**	**T**
T	**F**	**T**	**T**	**T**	**T**	**T**
T	**F**	**F**	**T**	**T**	**F**	**T**
F	**T**	**T**	**T**	T	**T**	T
F	**T**	**F**	**T**	T	**T**	T
F	**F**	**T**	**F**	T	**T**	T
F	**F**	**F**	**F**	F	**F**	F

Worksheet Chapter: 01 The Foundations: Logic and Proofs Section: 01.03 Propositional Equivalences

Complete the truth table given below to verify the associative laws.

p	*q*	*r*	*p* ∨ *q*	(*p* ∨ *q*) ∨ *r*	*q* ∨ *r*	*p* ∨ (*q* ∨ *r*)
T	**T**	**T**	**T**	**T**	**T**	**T**
T	**T**	**F**	**T**	**T**	**T**	**T**
T	**F**	**T**	**T**	**T**	**T**	**T**
T	**F**	**F**	**T**	**T**	**F**	**T**
F	**T**	**T**	**T**	*T*	**T**	*T*
F	**T**	**F**	**T**	*T*	**T**	*T*
F	**F**	**T**	**F**	*T*	**T**	*T*
F	**F**	**F**	**F**	*F*	**F**	*F*

18. award: **0 out of 2.71 points**

Complete the truth table given below to verify the associative laws.

p	*q*	*r*	*p* ∧ *q*	(*p* ∧ *q*) ∧ *r*	*q* ∧ *r*	*p* ∧ (*q* ∧ *r*)
T	**T**	**T**	**T**	**T**	**T**	**T**
T	**T**	**F**	**T**	**F**	**F**	**F**
T	**F**	**T**	**F**	**F**	**F**	**F**
T	**F**	**F**	**F**	**F**	**F**	**F**
F	**T**	**T**	**F**	F	**T**	F
F	**T**	**F**	**F**	F	**F**	F
F	**F**	**T**	**F**	F	**F**	F
F	**F**	**F**	**F**	F	**F**	F

Worksheet Chapter: 01 The Foundations: Logic and Proofs Section: 01.03 Propositional Equivalences

Complete the truth table given below to verify the associative laws.

p	*q*	*r*	*p* ∧ *q*	(*p* ∧ *q*) ∧ *r*	*q* ∧ *r*	*p* ∧ (*q* ∧ *r*)
T	**T**	**T**	**T**	**T**	**T**	**T**
T	**T**	**F**	**T**	**F**	**F**	**F**
T	**F**	**T**	**F**	**F**	**F**	**F**
T	**F**	**F**	**F**	**F**	**F**	**F**
F	**T**	**T**	**F**	*T*	**T**	*T*
F	**T**	**F**	**F**	*T*	**F**	*T*
F	**F**	**T**	**F**	*T*	**F**	*T*
F	**F**	**F**	**F**	*T*	**F**	*T*

19. award:
2.71 out of 2.71 points

Show that [¬p∧ (p ∨ q)] → q is a tautology by completing the below truth tables.

p	*q*	¬*p*	*p* ∨ *q*	¬*p* ∧ (*p* ∨ *q*)	[¬*p* ∧ (*p* ∨ *q*)] → *q*
T	T	F	T	F	T
T	F	F	T	F	T
F	T	T	T	T	T
F	F	T	F	F	T

Worksheet Chapter: 01 The Foundations: Logic and Proofs Section: 01.03 Propositional Equivalences

Show that [¬p∧ (p ∨ q)] → q is a tautology by completing the below truth tables.

p	*q*	¬*p*	*p* ∨ *q*	¬*p* ∧ (*p* ∨ *q*)	[¬*p* ∧ (*p* ∨ *q*)] → *q*
T	T	F	*T*	F	T
T	F	F	T	*F*	T
F	T	T	T	T	T
F	F	T	F	*F*	*T*

20. award:
1.55 out of 2.71 points

Complete the truth table given below for the conditional statement [(p → q) ∧ (q → r)] → (p → r).

p	*q*	*r*	(*p* → *q*)	(*q* → *r*)	(*p* → *q*) ∧ (*q* → *r*)	(*p* → *r*)	[(*p* → *q*) ∧ (*q* → *r*)] → (*p* → *r*)
T	T	T	T	T	T	T	T
T	T	F	T	T	F	F	T
T	F	T	F	T	F	T	T
T	F	F	F	T	F	T	T
F	T	T	T	T	T	T	T
F	T	F	T	F	F	T	T
F	F	T	T	T	F	T	T
F	F	F	T	T	T	T	T

The given conditional statement is a tautology
true

Worksheet Chapter: 01 The Foundations: Logic and Proofs Section: 01.03 Propositional Equivalences

Complete the truth table given below for the conditional statement [(p → q) ∧ (q → r)] → (p → r).

p	*q*	*r*	(*p* → *q*)	(*q* → *r*)	(*p* → *q*) ∧ (*q* → *r*)	(*p* → *r*)	[(*p* → *q*) ∧ (*q* → *r*)] → (*p* → *r*)
T	T	T	T	T	T	T	T
T	T	F	T	*F*	*F*	F	T
T	F	T	F	T	F	T	T
T	F	F	F	T	F	*F*	*T*
F	T	T	T	T	T	T	T
F	T	F	T	F	F	T	T
F	F	T	*T*	T	*T*	T	T
F	F	F	T	T	T	T	T

The given conditional statement is a tautology
true

21. award:
0.68 out of 2.71 points

Complete the truth table given below for the conditional statement [p ∧ (p → q)] → q.

p	*q*	*p* → *q*	*p* ∧ (*p* → *q*)	[*p* ∧ (*p* → *q*)] → *q*
T	T	T	T	T
T	F	T	F	T
F	T	F	F	F
F	F	T	T	F

The given conditional statement is not a tautology.
true

Worksheet Chapter: 01 The Foundations: Logic and Proofs Section: 01.03 Propositional Equivalences

Complete the truth table given below for the conditional statement [p ∧ (p → q)] → q.

p	*q*	*p* → *q*	*p* ∧ (*p* → *q*)	[*p* ∧ (*p* → *q*)] → *q*
T	T	T	T	*T*
T	F	*F*	F	T
F	T	*T*	*F*	*T*
F	F	T	*F*	*T*

The given conditional statement is not a tautology.
false

22. award:
2.09 out of
2.71 points

Complete the truth table given below for the conditional statement $[(p \vee q) \wedge (p \to r) \wedge (q \to r)] \to r$.

p	q	r	$(p \vee q)$	$(p \to r)$	$(p \vee q) \wedge (p \to r)$	$(q \to r)$	$(p \vee q) \wedge (p \to r) \wedge (q \to r)$	$[(p \vee q) \wedge (p \to r) \wedge (q \to$
T	T	T	T	T	T	T	T	T
T	T	F	T	T	F	F	F	T
T	F	T	T	T	T	T	T	T
T	F	F	T	F	F	T	F	T
F	T	T	T	T	T	T	T	T
F	T	F	T	T	T	F	F	T
F	F	T	T	T	F	T	F	T
F	F	F	T	T	F	T	F	T

The given conditional statement is a tautology.
true

Worksheet	Chapter: 01 The Foundations: Logic and Proofs	Section: 01.03 Propositional Equivalences

Complete the truth table given below for the conditional statement $[(p \vee q) \wedge (p \to r) \wedge (q \to r)] \to r$.

p	q	r	$(p \vee q)$	$(p \to r)$	$(p \vee q) \wedge (p \to r)$	$(q \to r)$	$(p \vee q) \wedge (p \to r) \wedge (q \to r)$	$[(p \vee q) \wedge (p \to r) \wedge (q \to$
T	T	T	T	T	T	T	T	T
T	T	F	T	F	F	F	F	T
T	F	T	T	T	T	T	T	T
T	F	F	T	F	F	T	F	T
F	T	T	T	T	T	T	T	T
F	T	F	T	T	T	F	F	T
F	F	T	F	T	F	T	F	T
F	F	F	F	T	F	T	F	T

The given conditional statement is a tautology.
true

23. award:
2.71 out of
2.71 points

Identify the compound proposition involving the propositional variables p, q, and r that is true when p and q are true and r is false, but is false otherwise.

- ○ $p \wedge q \vee \neg r$
- ◉ $p \wedge q \wedge \neg r$
- ○ $p \vee q \wedge \neg r$
- ○ $p \vee q \vee \neg r$

The compound proposition involving the propositional variables p, q, and r that is true when p and q are true and r is false, but is false otherwise is $p \wedge q \wedge \neg r$.

Multiple Choice	Chapter: 01 The Foundations: Logic and Proofs	Section: 01.03 Propositional Equivalences

24. award:
2.71 out of
2.71 points

Let $P(x)$ be the statement "the word x contains the letter a."
What is the truth value of P(orange)?

- ◉ True
- ○ False

The word "orange" contains the letter "a."

True / False	Chapter: 01 The Foundations: Logic and Proofs	Section: 01.04 Predicates and Quantifiers

25. award:
2.71 out of
2.71 points Your answer(s) received credit but don't exactly match the correct answer(s).

Let $P(x)$ be the statement "the word x contains the letter a."
The truth value of P(lemon) is ______.

False

The word "lemon" does not contain the letter "a."

Fill in the Blank	Chapter: 01 The Foundations: Logic and Proofs	Section: 01.04 Predicates and Quantifiers

26. award:
0 out of
2.71 points

Let $P(x)$ be the statement "the word x contains the letter a."
What is the truth value of P(true)?

- ◉ True
- ○ False

The word "true" does not contain the letter "a".

True / False	Chapter: 01 The Foundations: Logic and Proofs	Section: 01.04 Predicates and Quantifiers

27. award:
0 out of
2.71 points

Let $P(x)$ be the statement "the word x contains the letter a."
The truth value of P (false) is false.
Is the above statement true?

- (●) Yes
- ( ) No

The word "false" contains the letter "a."

Yes / No	Chapter: 01 The Foundations: Logic and Proofs	Section: 01.04 Predicates and Quantifiers

28. award:
2.71 out of
2.71 points

Let $Q(x, y)$ denote the statement "x is the capital of y."
What is the truth value of Q(Denver, Colorado)?

- (●) True
- ( ) False

Denver is the capital of Colorado.

True / False	Chapter: 01 The Foundations: Logic and Proofs	Section: 01.04 Predicates and Quantifiers

29. award:
2.71 out of
2.71 points

Let $Q(x,y)$ denote the statement "x is the capital of y."
The truth value of Q(Detroit, Michigan) is true.
Is the above statement false?

- (●) Yes
- ( ) No

Detroit is not the capital of Michigan.

Yes / No	Chapter: 01 The Foundations: Logic and Proofs	Section: 01.04 Predicates and Quantifiers

30. award:
2.71 out of
2.71 points Your answer(s) received credit but don't exactly match the correct answer(s).

Let $Q(x,y)$ denote the statement "x is the capital of y."
The truth value of Q(Massachusetts, Boston) is ______.

False

Massachusetts is not the capital of Boston.

Fill in the Blank	Chapter: 01 The Foundations: Logic and Proofs	Section: 01.04 Predicates and Quantifiers

31. award:
2.71 out of
2.71 points

Let $Q(x,y)$ denote the statement "x is the capital of y."
What is the truth value of Q(NewYork, NewYork).

- ( ) True
- (●) False

NewYork is not the capital of NewYork.

True / False	Chapter: 01 The Foundations: Logic and Proofs	Section: 01.04 Predicates and Quantifiers

32. award:
2.71 out of
2.71 points

State the value of x after the statement if $P(x)$ then $x := 1$ is executed, where $P(x)$ is the statement "$x > 1$."
The value of x when the statement $x = 0$ is reached is 1.

- ( ) True
- (●) False

Since $x = 0 < 1$, x does not satisfy the condition $P(x)$.Hence, the value of x remains 0.

True / False	Chapter: 01 The Foundations: Logic and Proofs	Section: 01.04 Predicates and Quantifiers

33. award:
2.71 out of 2.71 points

State the value of x after the statement if $P(x)$ then $x := 1$ is executed, where $P(x)$ is the statement "x > 1,"
The value of x when the statement x = 1 is reached is 1.
Is the above statement true?

- (•) Yes
- ( ) No

Since the $x = 1$ does not satisfy the condition $x > 1$, the value of x remains 1.

Yes / No	Chapter: 01 The Foundations: Logic and Proofs	Section: 01.04 Predicates and Quantifiers

34. award:
2.71 out of 2.71 points

State the value of x after the statement if $P(x)$ then $x := 1$is executed, where $P(x)$ is the statement "$x > 1$."
The value of x when the statement $x = 2$ is reached is _____.

- ( ) 0
- ( ) 2
- ( ) 3
- (•) 1

Since $x = 2$ satisfies the condition $x > 1$, the statement $x := 1$ is executed.

Multiple Choice	Chapter: 01 The Foundations: Logic and Proofs	Section: 01.04 Predicates and Quantifiers

35. award:
0.91 out of 2.71 points

Let $N(x)$ be the statement "x has visited North Dakota," where the domain consists of the students in your school. Identify the expression for the quantification $\exists xN(x)$.

- [ ] Some student in the school has visited North Dakota.
- [x] There exists a student in the school who has visited North Dakota.
- [ ] Every student in the school has visited North Dakota.
- [ ] There is atleast one student who has visited North Dakota.
- [ ] All the students in the school have visited North Dakota.

The quantification means there are students who visited North Dakota. Hence, expressions similar to "There exist a student who has visited North Dakota" are correct.

Check All That Apply	Chapter: 01 The Foundations: Logic and Proofs	Section: 01.04 Predicates and Quantifiers

36. award:
2.71 out of 2.71 points

Let $N(x)$ be the statement "x has visited North Dakota," where the domain consists of the students in your school. Identify the expressions for the quantifications $\forall xN(x)$.

- [x] Every student in the school has visited North Dakota.
- [x] All students in the school have visited North Dakota.
- [ ] No student has visited North Dakota.
- [ ] Some students have visited North Dakota.

The expressions that mean every student of the school has visited North Dakota are correct.

Check All That Apply	Chapter: 01 The Foundations: Logic and Proofs	Section: 01.04 Predicates and Quantifiers

37. award:
2.71 out of 2.71 points

Let $N(x)$ be the statement "x has visited North Dakota," where the domain consists of the students in your school. The expressions for the quantification $\neg\exists xN(x)$ are "No student in the school has visited North Dakota" and "There does not exist a student in the school who has visited North Dakota."
Is the above statement false?

- ( ) Yes
- (•) No

Since the quantification $\neg\exists xN(x)$ is the negation of "Some student in the school has visited North Dakota," the expressions that mean no student in the school has visited North Dakota are correct.

Yes / No	Chapter: 01 The Foundations: Logic and Proofs	Section: 01.04 Predicates and Quantifiers

38. award:
1.36 out of 2.71 points

Let $N(x)$ be the statement "x has visited North Dakota," where the domain consists of the students in your school. Identify the expressions for the quantification $\exists x\neg N(x)$.

- [x] Some student in the school has not visited North Dakota.
- [ ] All the students in the school has not visited North Dakota.
- [x] There exists a student in the school who has not visited North Dakota.
- [x] There exists a student in the school who has visited North Dakota.
- [ ] Every student in the school has not visited North Dakota.

Since the quantification is the negation of the statement "Some student in the school has visited North Dakota," the statements that mean "Some student in the school has not visited North Dakota" are correct.

Check All That Apply	Chapter: 01 The Foundations: Logic and Proofs	Section: 01.04 Predicates and Quantifiers

39. award: **2.71 out of 2.71 points**

Let $N(x)$ be the statement "x has visited North Dakota," where the domain consists of the students in your school. The expression for the quantification $\neg\forall x N(x)$ is "It is not true that every student in the school _____ North Dakota."

has visited ✔

Since the quantification is the negation of "Every student in the school has visited North Dakota," the expression "It is not true that every student in the school has visited North Dakota" is the correct answer.

Fill in the Blank	Chapter: 01 The Foundations: Logic and Proofs	Section: 01.04 Predicates and Quantifiers

40. award: **2.71 out of 2.71 points**

Let $N(x)$ be the statement "x has visited North Dakota," where the domain consists of the students in your school. The expression for the quantification $\forall x\neg N(x)$ is "All students in the school have visited North Dakota."

- ( ) True
- ✔ (•) False

The expression for the quantification $\forall x\neg N(x)$ is "All students in the school have not visited North Dakota".

True / False	Chapter: 01 The Foundations: Logic and Proofs	Section: 01.04 Predicates and Quantifiers

41. award: **1.36 out of 2.71 points**

Translate the statement "$\forall x(R(x) \rightarrow H(x))$" into English where $R(x)$ is "x is a rabbit" and $H(x)$ is "x hops" where the domain consists of all animals.

- ✔ [x] If an animal is a rabbit, then that animal hops.
- ✔ [ ] Every animal is a rabbit and hops.
- ✘ → [ ] Every rabbit hops.
- ✔ [ ] If an animal hops, then that is a rabbit.

The statement "every rabbit hops" is correct.

Check All That Apply	Chapter: 01 The Foundations: Logic and Proofs	Section: 01.04 Predicates and Quantifiers

42. award: **0 out of 2.71 points**

Let $R(x)$ is "x is a rabbit" and $H(x)$ is "x hops" where the domain consists of all animals. Identify the expression of the quantification $\forall x(R(x) \wedge H(x))$.

- ( ) Every animal is a rabbit and hops.
- ( ) An animal is a rabbit if and only if it hops.
- → ( ) Every animal is a rabbit and hops.
- ✘ (•) Every rabbit hops.

Since the quantification is the conjunction of two propositions is true for all animals, the expression is "Every animal is a rabbit and it hops."

Multiple Choice	Chapter: 01 The Foundations: Logic and Proofs	Section: 01.04 Predicates and Quantifiers

43. award: **2.71 out of 2.71 points**

Let $R(x)$ is "x is a rabbit" and $H(x)$ is "x hops" where the domain consists of all animals. The expression of the quantification $\exists x(R(x) \rightarrow H(x))$ is "There exists an animal such that if it is a rabbit, then it hops."

- ✔ (•) True
- ( ) False

Since the quantification means that there is an animal such that if it is a rabbit, then it hops, the expression of the quantification $\exists x(R(x) \rightarrow H(x))$ is "There exists an animal such that if it is a rabbit, then it hops."

True / False	Chapter: 01 The Foundations: Logic and Proofs	Section: 01.04 Predicates and Quantifiers

44. award: **1.36 out of 2.71 points**

Let $R(x)$ is "x is a rabbit" and $H(x)$ is "x hops" where the domain consists of all animals. Identify the expressions of the quantification $\exists x(R(x) \wedge H(x))$.

- ✔ [x] There exists an animal that is a rabbit and hops.
- ✔ [ ] Every animal is a rabbit and every rabbit hops.
- ✘ → [ ] Some hopping animals are rabbits.
- ✔ [ ] An animal is a rabbit if it hops.

Since the quantification means that there exists an animal that satisfies both conditions, the statement similar to "There exists an animal that is a rabbit and hops" are correct.

Check All That Apply	Chapter: 01 The Foundations: Logic and Proofs	Section: 01.04 Predicates and Quantifiers

45. award:
2.71 out of 2.71 points

Let $C(x)$ be the statement "x has a cat," let $D(x)$ be the statement "x has a dog," and let $F(x)$ be the statement "x has a ferret," where the domain consist of all students in your class. Identify the quantification for the statement "A student in your class has a cat, a dog, and a ferret."

- (selected, correct) $\exists x(C(x) \wedge D(x) \wedge F(x))$
- $\forall\exists x(C(x) \vee D(x) \vee F(x))$
- $\exists x(C(x) \vee D(x) \vee F(x))$
- $\forall x(C(x) \wedge D(x) \wedge F(x))$

Multiple Choice	Chapter: 01 The Foundations: Logic and Proofs	Section: 01.04 Predicates and Quantifiers

46. award:
2.71 out of 2.71 points

Let $C(x)$ be the statement "x has a cat," let $D(x)$ be the statement "x has a dog," and let $F(x)$ be the statement "x has a ferret," where the domain consist of all students in your class. The quantification for the statement "All students in your class have a cat, a dog, or a ferret" is $\forall x(C(x) \vee D(x) \vee F(x))$.

- (selected, correct) True
- False

The quantification for the statement "All students in your class have a cat, a dog, or a ferret" is $\forall x(C(x) \vee D(x) \vee F(x))$.

True / False	Chapter: 01 The Foundations: Logic and Proofs	Section: 01.04 Predicates and Quantifiers

47. award:
2.71 out of 2.71 points

Let $C(x)$ be the statement "x has a cat," let $D(x)$ be the statement "x has a dog," and let $F(x)$ be the statement "x has a ferret," where the domain consist of all students in your class. Identify the quantification for the statement "Some student in your class has a cat and a ferret, but not a dog."

- $\exists x(C(x) \wedge \neg F(x) \wedge D(x))$
- $\exists x(C(x) \vee F(x) \vee \neg D(x))$
- (selected, correct) $\exists x(C(x) \wedge F(x) \wedge \neg D(x))$
- $\exists x\neg(C(x) \wedge F(x) \wedge D(x))$

Multiple Choice	Chapter: 01 The Foundations: Logic and Proofs	Section: 01.04 Predicates and Quantifiers

48. award:
2.71 out of 2.71 points

Let $C(x)$ be the statement "x has a cat," let $D(x)$ be the statement "x has a dog," and let $F(x)$ be the statement "x has a ferret," where the domain consist of all students in your class. Identify the quantification for the statement "No student in your class has a cat, a dog, and a ferret" is $\exists x(\neg C(x) \wedge \neg D(x) \wedge \neg F(x))$.

- True
- (selected, correct) False

The quantification for the statement "No student in your class has a cat, a dog, and a ferret" is $\neg\exists x(C(x) \wedge D(x) \wedge F(x))$.

True / False	Chapter: 01 The Foundations: Logic and Proofs	Section: 01.04 Predicates and Quantifiers

49. award:
2.71 out of 2.71 points

Let $C(x)$ be the statement "x has a cat," let $D(x)$ be the statement "x has a dog," and let $F(x)$ be the statement "x has a ferret," where the domain consist of all students in your class. Identify the quantification for the statement "For each of the three animals, cats, dogs, and ferrets, there is a student in your class who has this animal as a pet."

- $(\exists x(C(x)) \vee (\exists x(D(x)) \vee (\exists x(F(x))$
- $\exists x(C(x) \wedge (D(x) \wedge (F(x))$
- (selected, correct) $(\exists x(C(x)) \wedge (\exists x(D(x)) \wedge (\exists x(F(x))$

Multiple Choice	Chapter: 01 The Foundations: Logic and Proofs	Section: 01.04 Predicates and Quantifiers

50. award:
2.71 out of 2.71 points

Identify the statements that have the truth value "true" if the domain of each variable consists of all real numbers.

- [x] (correct) $\exists x(x^2 = 2)$
- [ ] (correct) $\exists x(x^2 = -1)$
- [x] (correct) $\forall x(x^2 + 2 \geq 1)$
- [ ] (correct) $\forall x(x^2 \neq x)$

Check All That Apply	Chapter: 01 The Foundations: Logic and Proofs	Section: 01.04 Predicates and Quantifiers

51. award:
0 out of
2.71 points

Let $F(x)$ be "x has fleas," and let the domain of discourse be dogs. Identify the expression for the statement "All dogs have fleas" and its negation and the English sentence for the negation.

- The expression is $\exists x\, F(x)$, its negation is $\forall x \neg F(x)$ and the sentence is "There is a dog that has fleas."
- → The expression is $\forall x\, F(x)$, its negation is $\exists x \neg F(x)$ and the sentence is "There is a dog that does not have fleas."
- ✗ (selected) The expression is $\forall x\, F(x)$, its negation is $\forall x \neg F(x)$ and the sentence is "There is no dog that does not have fleas."
- The expression is $\neg \forall x\, F(x)$, its negation is $\exists x F(x)$ and the sentence is "There is a dog that does not have fleas."

Multiple Choice	Chapter: 01 The Foundations: Logic and Proofs	Section: 01.04 Predicates and Quantifiers

52. award:
0 out of
2.71 points

Let $F(x)$ be "x can add," and let the domain of discourse be horses. Identify the expression for the statement "There is a horse that can add" and its negaion" and its negation and the English sentence for the negation.

- The expression is $\neg \exists x\, F(x)$, its negation is $\forall x F(x)$ and the sentence is "All horse can add."
- ✗ (selected) The expression is $\exists x\, F(x)$, its negation is $\neg \forall x F(x)$ and the sentence is "No horse can add."
- → The expression is $\exists x\, F(x)$, its negation is $\forall x \neg F(x)$ and the sentence is "No horse can add."
- The expression is $\exists x\, F(x)$, its negation is $\forall x \neg F(x)$ and the sentence is "No horse cannot add."

Multiple Choice	Chapter: 01 The Foundations: Logic and Proofs	Section: 01.04 Predicates and Quantifiers

53. award:
2.71 out of
2.71 points

Let $F(x)$ be "x can climb," and let the domain of discourse be koalas. Identify the expression for the statement "Every koala can climb" and its negation and the English sentence for the negation.

- ✓ (selected) The expression is $\forall x\, F(x)$, its negation is $\exists x \neg F(x)$ and the sentence is "There is a koala that cannot climb."
- The expression is $\forall x\, \neg F(x)$, its negation is $\exists x F(x)$ and the sentence is "There is a koala that cannot climb."
- The expression is $\forall x\, F(x)$, its negation is $\exists x \neg F(x)$ and the sentence is "There is a koala that can climb."
- The expression is $\exists x\, \neg F(x)$, its negation is $\exists x F(x)$ and the sentence is "There is a koala that can climb."

Multiple Choice	Chapter: 01 The Foundations: Logic and Proofs	Section: 01.04 Predicates and Quantifiers

54. award:
0 out of
2.71 points

Let $F(x)$ be "x can speak French," and let the domain of discourse be monkeys. Identify the expression for the statement "No monkey can speak French" and its negation and the English sentence for the negation.

- → The expression is $\forall x \neg F(x)$, its negation is $\exists x\, F(x)$ and the sentence is "There is a monkey that can speak French."
- ✗ (selected) The expression is $\forall x \neg F(x)$, its negation is $\exists x\, F(x)$ and the sentence is "There is a monkey that cannot speak French."
- The expression is $\exists x \neg F(x)$, its negation is $\forall x\, F(x)$ and the sentence is "There is a monkey that can speak French."
- The expression is $\forall x F(x)$, its negation is $\exists x\, \neg F(x)$ and the sentence is "There is a monkey that can speak French."

Multiple Choice	Chapter: 01 The Foundations: Logic and Proofs	Section: 01.04 Predicates and Quantifiers

55. award:
2.71 out of
2.71 points

Let $F(x)$ be "x can swim," and $G(x)$ be "x can catch fish," and let the domain of discourse be pigs. Identify the expression for the statement "There exists a pig that can swim and catch fish" and its negation and the English sentence for the negation.

- The expression for the statement is $\exists x\, (F(x) \vee G(x))$, and its negation is $\forall x \neg (F(x) \wedge G(x))$ and the sentence is "No pig can both swim and catch fish."
- ✓ (selected) The expression for the statement is $\exists x\, (F(x) \wedge G(x))$, and its negation is $\forall x \neg (F(x) \wedge G(x))$ and the sentence is "No pig can both swim and catch fish."
- The expression for the statement is $\exists x\, (F(x) \wedge G(x))$, and its negation is $\forall x \neg (F(x) \wedge G(x))$ and the sentence is "All pigs can both swim and catch fish."
- The expression for the statement is $\exists x\, (F(x) \wedge G(x))$, and its negation is $\forall x \neg (F(x) \vee G(x))$ and the sentence is "No pig can both swim and catch fish."

Multiple Choice	Chapter: 01 The Foundations: Logic and Proofs	Section: 01.04 Predicates and Quantifiers

Translate these specifications into English where $F(p)$ is "Printer p is out of service," $B(p)$ is "Printer p is busy," $L(j)$ is "Print job j is lost," and $Q(j)$ is "Print job j is queued."

Section Break	Chapter: 01 The Foundations: Logic and Proofs	Section: 01.04 Predicates and Quantifiers

56. award:
0 out of
2.71 points

a) $\exists p(F(p) \wedge B(p)) \rightarrow \exists j L(j)$

- ✗ (selected) If all printers are both out of service and busy, then all jobs have been lost.
- If some job has been lost, then there is a printer that is both out of service and busy.
- If there is a printer that is either out of service or busy, then some job has been lost.
- A printer is both out of service and busy if some job is lost.
- → If there is a printer that is both out of service and busy, then some job has been lost.

Multiple Choice	Chapter: 01 The Foundations: Logic and Proofs	Section: 01.04 Predicates and Quantifiers

57. award:
2.71 out of
2.71 points

b) $\forall pB(p) \rightarrow \exists jQ(j)$

- If every printer is busy, then all jobs are in the queue.
- If there is a job in the queue, then some printer is busy.
- If there is a printer that is busy, then all jobs are in the queue.
- If every printer is busy, then there is a job in the queue.

Multiple Choice	Chapter: 01 The Foundations: Logic and Proofs	Section: 01.04 Predicates and Quantifiers

58. award:
0 out of
2.71 points

c) $\exists j(Q(j) \wedge L(j)) \rightarrow \exists pF(p)$

- If there is a job that is either queued or lost, then some printer is out of service.
- If all printers are out of service, then all jobs are both queued and lost.
- If all jobs are either queued or lost, then all printers are out of service.
- If some printer is out of service, then there is a job that is either queued or lost.
- → If there is a job that is both queued and lost, then some printer is out of service.

Multiple Choice	Chapter: 01 The Foundations: Logic and Proofs	Section: 01.04 Predicates and Quantifiers

59. award:
2.82 out of
2.82 points

d) $(\forall pB(p) \wedge \forall jQ(j)) \rightarrow \exists jL(j)$

- If some printer is busy and some job is queued, then all jobs are lost.
- If every printer is busy or every job is queued, then some job is lost.
- If some job is lost, then some printer is busy and every job is queued.
- If every printer is busy and every job is queued, then some job is lost.
- If some job is lost, then every printer is busy or every job is queued.

Multiple Choice	Chapter: 01 The Foundations: Logic and Proofs	Section: 01.04 Predicates and Quantifiers