

Unit 3 - Week 2: Mathematical Logic

Course outline

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Week 2: Mathematical Logic

● Lec 1: First Order Logic: Introduction (Cont'd)

○ Lec 2: Proof System for Propcal

○ Lec 3: First Order Logic: wffs, interpretations, models

○ Quiz : Assignment 2

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Week 3: Mathematical Logic And Set Theory

Week 4: Graph Theory

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Week 6: Set Theory & Number Theory

Week 7: Set Theory & Number Theory

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Live Session-1

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Week 11: Algebra

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Assignment 2

The due date for submitting this assignment has passed.
As per our records you have not submitted this assignment.

Due on 2019-08-21, 23:59 IST.

1) If the domain is the set of words {violet, indigo, blue, green, yellow, orange, red}, which of the following sentences is/are true? 1 point

- (P) $\forall x$ (if x does not contain the letter 'e', then x contains the letter 'n')
 (Q) $\exists x$ (if x contains the letter 'e', then x contains at most 4 letters)
 (R) $\forall x$ (if x contains more than 5 letters, then x contains the letter 'o')

- all of P, Q, R
 only P and R
 only Q and R
 only P

No, the answer is incorrect.
Score: 0

Accepted Answers:
all of P, Q, R

2) Q2. If the domain is the set of integers, then which of the following is/are true? 1 point

- (P) $\forall n(n + 1) > n$ (Q) $\exists n(n = 2n)$
 (R) $\forall n(n \neq -n)$ (S) $\forall n(n^2 \geq n)$

- all of P, Q, R and S
 only P, Q and S
 only P, Q and R
 only P

No, the answer is incorrect.
Score: 0

Accepted Answers:
only P, Q and S

3) Which of the following are logical consequences of $\{(\alpha \rightarrow \neg\beta), \beta, (\neg\gamma \rightarrow \alpha)\}$? 1 point

- $(\alpha \rightarrow \neg\beta)$
 $\neg\beta$
 γ
 α

No, the answer is incorrect.
Score: 0

Accepted Answers:
 γ

4) Which of the following are logical consequences of $\{(\alpha\beta + \bar{\alpha}\beta) + \alpha\bar{\beta}\}, (\alpha + \beta) \rightarrow (\bar{\gamma} \rightarrow \alpha), \bar{\gamma}\}$ 1 point

- $\bar{\beta}$
 β
 $\bar{\alpha}$
 α

No, the answer is incorrect.
Score: 0

Accepted Answers:
 α

5) In the following, the domain of x is a set of students and the domain of y is a set of courses. If Pxy stands for "student x is in course y ". Which of the following paraphrases the sentence: "No course is without students"? 1 point

- $\exists y\forall xPxy$
 $\exists x\forall yPxy$
 $\forall y\exists xPxy$
 $\forall x\exists yPxy$

No, the answer is incorrect.
Score: 0

Accepted Answers:
 $\forall y\exists xPxy$

6) Which of the following is the negation of $\forall x\exists y(Pxy \rightarrow Qxy)$ 1 point

- $\forall x\exists y(Qxy \rightarrow Pxy)$
 $\exists x\forall y(Pxy\bar{Qxy})$
 $\forall x\exists y(Pxy\bar{Qxy})$
 $\forall x\exists y(Pxy \rightarrow Qxy)$

No, the answer is incorrect.
Score: 0

Accepted Answers:
 $\exists x\forall y(Pxy\bar{Qxy})$

7) Which of the following is a logical consequence of $\forall x(Px \vee Qx)$ 1 point

- $\forall x(Px) \vee \forall x(Qx)$
 $\exists x(Px) \vee \exists x(Qx)$
 $\exists x(Px \vee Qx)$
 $\neg\exists x(\bar{Px} \wedge \bar{Qx})$

No, the answer is incorrect.
Score: 0

Accepted Answers:
 $\forall x(Px) \vee \forall x(Qx)$

8) Which of the following is/are logically valid? 1 point

- (P) $\exists!x(Px) \rightarrow \exists x(Px)$
 (Q) $\forall x(Px) \rightarrow \exists!x(Px)$
 (R) $\exists!x(\neg Px) \rightarrow \neg\forall x(Px)$

- all of P, Q and R
 only P
 only P and Q
 only P and R

No, the answer is incorrect.
Score: 0

Accepted Answers:
only P and R