Score: **228.67** out of 480 points (47.64%)

1. award:
8 out of 10.00 points

The mathematical statement, $\forall x \exists y (x < y)$ means that for every real number y there exists a real number x such that x is less than y.

- True
- False (selected, correct)

$\forall x \exists y (x < y)$ means that for every real number x there exists a real number y such that x is less than y.

True / False	Chapter: 01 The Foundations: Logic and Proofs	Section: 01.05 Nested Quantifiers

2. award:
0 out of 10.00 points

Translate the statement $\forall x \forall y(((x \geq 0) \wedge (y \geq 0)) \rightarrow (xy \geq 0))$ into English.

- For every real number x and real number y, if x or y are both nonnegative, then their product is positive. (selected, incorrect)
- For every real number x and real number y, x or y are both nonnegative if and only if their product is nonnegative.
- → For every real number x and real number y, if x and y are both nonnegative, then their product is nonnegative.
- For every real number x and real number y, x and y are both nonnegative if and only if their product is nonnegative.

Since the numbers x and y are nonnegative real numbers, their product xy is also a nonnegative real number.

Multiple Choice	Chapter: 01 The Foundations: Logic and Proofs	Section: 01.05 Nested Quantifiers

3. award:
8 out of 10.00 points

Is the statement $\forall x \forall y \exists z(xy = z)$ means that for every real number x and real number y, there exists a real number z such that $xy = z$?

- Yes (selected, correct)
- No

The product of two real numbers are always a real number.

Yes / No	Chapter: 01 The Foundations: Logic and Proofs	Section: 01.05 Nested Quantifiers

4. award:
4.67 out of 10.00 points

Let $P(x, y)$ be the statement "Student x has taken class y," where the domain for x consists of all students in your class and for y consists of all computer science courses at your school.
Match the following quantifications (in the left column) with their corresponding expressions (in the left column).

1. $\forall y \exists x P(x, y)$	There is a student in your class who has taken every computer science course.	1	✗ #2
2. $\exists x \forall y P(x, y)$	Some student in your class has taken some computer science course.	3	✓
3. $\exists x \exists y P(x, y)$	Every student in your class has taken at least one computer science course.	4	✓
4. $\forall x \exists y P(x, y)$	Every student in your class has taken every computer science course.	5	✓
5. $\forall x \forall y P(x, y)$	Every computer science course has been taken by at least one student in your class.	2	✗ #1
6. $\exists y \forall x P(x, y)$	There is a computer science course that every student in your class has taken.	6	✓

Matching	Chapter: 01 The Foundations: Logic and Proofs	Section: 01.05 Nested Quantifiers

Let $W(x,y)$ mean that student x has visited website y, where the domain for x consists of all students in your school and the domain for y consists of all websites. Express each of these statements by a simple English sentence.

Section Break	Chapter: 01 The Foundations: Logic and Proofs	Section: 01.05 Nested Quantifiers

5. award:
8 out of 10.00 points

W(Sarah Smith, www.att.com)

- ○ www.att.com is a website.
- ○ Sarah Smith is a student.
- ○ Sarah Smith has visited a website.
- ✓ ● Sarah Smith has visited www.att.com.
- ○ A student has visited www.att.com.

Multiple Choice	Chapter: 01 The Foundations: Logic and Proofs	Section: 01.05 Nested Quantifiers

6. award:
8 out of 10.00 points

$\exists x W(x, \text{www.imdb.org})$

- (selected, correct) At least one student has visited www.imdb.org.
- All students have visited www.imdb.org.
- At least one website is called www.imdb.org.
- All students have visited a website.
- All websites are called www.imdb.org.

Multiple Choice	Chapter: 01 The Foundations: Logic and Proofs	Section: 01.05 Nested Quantifiers

7. award:
8 out of 10.00 points

$\exists y W(\text{José Orez}, y)$

- José Orez has visited more than one website.
- José Orez has visited all websites.
- At least once website has been visited.
- All websites have been visited.
- (selected, correct) José Orez has visited at least one website.

Multiple Choice	Chapter: 01 The Foundations: Logic and Proofs	Section: 01.05 Nested Quantifiers

8. award:
8 out of 10.00 points

$\exists y(W(\text{Ashok Puri}, y) \wedge W(\text{CindyYoon}, y))$

- There is a website that neither Ashok Puri nor Cindy Yoon has visited.
- All websites have been visited by either Ashok Puri or Cindy Yoon.
- There is a website that either Ashok Puri or Cindy Yoon has visited.
- All websites have been visited by both Ashok Puri and Cindy Yoon.
- (selected, correct) There is a website that both Ashok Puri and Cindy Yoon have visited.

Multiple Choice	Chapter: 01 The Foundations: Logic and Proofs	Section: 01.05 Nested Quantifiers

9. award:
8 out of 10.00 points

$\exists y \forall z(y \neq \text{(David Belcher)} \wedge (W(\text{David Belcher}, z) \rightarrow W(y, z)))$

- (selected, correct) There is a person besides David Belcher who has visited all the websites that David Belcher has visited.
- There is a person who has visited all the websites that David Belcher has visited.
- There is a person who has not visited all of the websites that David Belcher has visited.
- There is no person besides David Belcher who has visited all the websites that David Belcher has visited.
- Everyone besides David Belcher has visited all the websites that David Belcher has visited.

Multiple Choice	Chapter: 01 The Foundations: Logic and Proofs	Section: 01.05 Nested Quantifiers

10. award:
0 out of 10.00 points

$\exists x \exists y \forall z((x \neq y) \wedge (W(x, z) \leftrightarrow W(y, z)))$

- There are no two different people who have visited exactly the same websites.
- (selected, incorrect) There are two different people who have visited the exact same website.
- There are no two different people who have visited the exact same website.
- Every two different people have visited exactly the same websites.
- → There are two different people who have visited exactly the same websites.

Multiple Choice	Chapter: 01 The Foundations: Logic and Proofs	Section: 01.05 Nested Quantifiers

Let $C(x, y)$ mean that student x is enrolled in class y, where the domain for x consists of all students in your school and the domain for y consists of all classes being given at your school. Express each of these statements by a simple English sentence.

Section Break	Chapter: 01 The Foundations: Logic and Proofs	Section: 01.05 Nested Quantifiers

11. award:
8 out of 10.00 points

C(Randy Goldberg, CS 252)

- Someone is enrolled in CS 252.
- CS 252 is a class.
- (selected, correct) Randy Goldberg is enrolled in CS 252.
- Randy Goldberg is enrolled in a class.
- Randy Goldberg is a student.

Multiple Choice	Chapter: 01 The Foundations: Logic and Proofs	Section: 01.05 Nested Quantifiers

12. award: **8 out of 10.00 points**

$\exists x C(x, \text{Math 695})$

- ○ Someone is enrolled in a class.
- ○ Everyone is enrolled in a class.
- ○ Everyone is enrolled in Math 695.
- ○ Someone is enrolled in a class and enrolled in Math 695.
- ✔ ◉ Someone is enrolled in Math 695.

Multiple Choice	Chapter: 01 The Foundations: Logic and Proofs	Section: 01.05 Nested Quantifiers

13. award: **8 out of 10.00 points**

$\exists y C(\text{Carol Sitea}, y)$

- ○ Carol Sitea is enrolled in all courses.
- ✔ ◉ Carol Sitea is enrolled in some course.
- ○ Carol Sitea is a student.
- ○ Someone is enrolled in a course.
- ○ Someone is enrolled in all courses.

Multiple Choice	Chapter: 01 The Foundations: Logic and Proofs	Section: 01.05 Nested Quantifiers

14. award: **8 out of 10.00 points**

$\exists x(C(x, \text{Math 222}) \wedge C(x, \text{CS 252}))$

- ○ Some student is enrolled in either Math 222 or CS 252.
- ✔ ◉ Some student is enrolled simultaneously in Math 222 and CS 252.
- ○ All students are enrolled in either Math 222 or CS 252.
- ○ All students are enrolled simultaneously in Math 222 and CS 252.
- ○ Some student is enrolled in neither Math 222 nor CS 252.

Multiple Choice	Chapter: 01 The Foundations: Logic and Proofs	Section: 01.05 Nested Quantifiers

15. award:
0 out of
10.00 points

$\exists x \exists y \forall z((x \neq y) \wedge (C(x, z) \rightarrow C(y, z)))$

- ✗ (selected) There exist two distinct people enrolled in exactly the same courses.
- Every two distinct people are enrolled in the same courses.
- → There exist two distinct people, the second of whom is enrolled in every course that the first is enrolled in.
- Every two distinct people are enrolled in at least one identical course.
- There do not exist two distinct people, the second of whom is enrolled in every course that the first is enrolled in.

Multiple Choice	Chapter: 01 The Foundations: Logic and Proofs	Section: 01.05 Nested Quantifiers

16. award:
0 out of
10.00 points

$\exists x \exists y \forall z((x \neq y) \wedge (C(x, z) \leftrightarrow C(y, z)))$

- ✗ (selected) There exist two distinct people, the second of whom is enrolled in every course that the first is enrolled in.
- Every two distinct people are enrolled in the same courses.
- Every two distinct people are enrolled in at least one identical course.
- There do not exist two distinct people, the second of whom is enrolled in every course that the first is enrolled in.
- → There exist two distinct people enrolled in exactly the same courses.

Multiple Choice	Chapter: 01 The Foundations: Logic and Proofs	Section: 01.05 Nested Quantifiers

Let $F(x, y)$ be the statement "x can fool y," where the domain consists of all people in the world. Use quantifiers to express each of these statements

Section Break	Chapter: 01 The Foundations: Logic and Proofs	Section: 01.05 Nested Quantifiers

17. award:
8 out of
10.00 points

Everybody can fool Fred.

- $\exists x F(\text{Fred}, x)$
- $\forall x F(\text{Fred}, x)$
- $\exists x F(x, \text{Fred})$
- ✓ (selected) $\forall x F(x, \text{Fred})$

Multiple Choice	Chapter: 01 The Foundations: Logic and Proofs	Section: 01.05 Nested Quantifiers

18. award:
8 out of 10.00 points

Evelyn can fool everybody.

- (selected, correct) $\forall y F(\text{Evelyn}, y)$
- $\exists y F(y, \text{Evelyn})$
- $\forall y F(y, \text{Evelyn})$
- $\exists y F(\text{Evelyn}, y)$

Multiple Choice	Chapter: 01 The Foundations: Logic and Proofs	Section: 01.05 Nested Quantifiers

19. award:
8 out of 10.00 points

Everybody can fool somebody.

- $\exists y \exists x F(x,y)$
- $\forall y \exists x F(x,y)$
- $\exists y \forall x F(x,y)$
- (selected, correct) $\forall x \exists y F(x,y)$
- $\forall x \forall y F(x,y)$

Multiple Choice	Chapter: 01 The Foundations: Logic and Proofs	Section: 01.05 Nested Quantifiers

20. award:
8 out of 10.00 points

There is no one who can fool everybody.

- $\neg x \exists y F(x,y)$
- $\neg \forall x(\neg \forall y F(x,y))$
- $\neg \exists x(\neg \forall y F(x,y))$
- (selected, correct) $\neg \exists x \forall y F(x,y)$
- $\neg \exists x(\neg \exists y F(x,y))$

Multiple Choice	Chapter: 01 The Foundations: Logic and Proofs	Section: 01.05 Nested Quantifiers

21. award: **8 out of 10.00 points**

Everyone can be fooled by somebody.

- $\forall y\, \exists x F(y, x)$
- $\forall y\, \forall x F(x, y)$
- ✔ (selected) $\forall y\, \exists x F(x, y)$
- $\exists y\, \exists x F(x, y)$
- $\forall y\, \exists x \neg F(x, y)$

Multiple Choice	Chapter: 01 The Foundations: Logic and Proofs	Section: 01.05 Nested Quantifiers

22. award: **8 out of 10.00 points**

No one can fool both Fred and Jerry.

- $\neg\exists y \neg(F(x,\text{Fred}) \wedge F(x,\text{Jerry}))$
- ✔ (selected) $\neg\exists x(F(x,\text{Fred}) \wedge F(x,\text{Jerry}))$
- $\neg\forall x(F(x,\text{Fred}) \wedge F(x,\text{Jerry}))$
- $\neg\forall y(F(x,\text{Fred}) \wedge F(x,\text{Jerry}))$
- $\neg\exists y(F(x,\text{Fred}) \wedge F(x,\text{Jerry}))$

Multiple Choice	Chapter: 01 The Foundations: Logic and Proofs	Section: 01.05 Nested Quantifiers

23. award: **0 out of 10.00 points**

Nancy can fool exactly two people.

- $\exists y_1(F(\text{Nancy}, y_1) \wedge F(\text{Nancy}, y_2) \wedge y_1 \neq y_2 \wedge \forall y(F(\text{Nancy}, y) \rightarrow (y = y_1 \vee y = y_2)))$
- → $\exists y_1 \exists y_2(F(\text{Nancy}, y_1) \wedge F(\text{Nancy}, y_2) \wedge y_1 \neq y_2 \wedge \forall y(F(\text{Nancy}, y) \rightarrow (y = y_1 \vee y = y_2)))$
- ✘ (selected) $\exists y_1 \exists y_2(F(\text{Nancy}, y_1) \wedge F(\text{Nancy}, y_2) \wedge y_1 \neq y_2 \vee \forall y(F(\text{Nancy}, y) \rightarrow (y = y_1 \vee y = y_2)))$
- $\exists y_1 \exists y_2(F(\text{Nancy}, y_1) \wedge F(\text{Nancy}, y_2) \wedge y_1 = y_2 \wedge \forall y(F(\text{Nancy}, y) \rightarrow (y \neq y_1 \vee y \neq y_2)))$
- $\exists y_2(F(\text{Nancy}, y_1) \wedge F(\text{Nancy}, y_2) \wedge y_1 \neq y_2 \wedge \forall y(F(\text{Nancy}, y) \rightarrow (y = y_1 \vee y = y_2)))$

Multiple Choice	Chapter: 01 The Foundations: Logic and Proofs	Section: 01.05 Nested Quantifiers

24. award: **0 out of 10.00 points**

There is exactly one person whom everybody can fool.

- $\forall y(\forall x(F(x, y) \rightarrow x \neq y))$
- $\exists y(\forall xF(x, y) \wedge \forall z(\forall xF(x, z) \rightarrow z = y))$
- $\exists y(\forall xF(x, y) \wedge \exists z(\forall xF(x, z) \rightarrow z = y))$
- $\exists y(\forall x(F(x, y))$
- $\exists y(\forall x(F(x, y) \wedge x \neq y))$

Multiple Choice	Chapter: 01 The Foundations: Logic and Proofs	Section: 01.05 Nested Quantifiers

25. award: **8 out of 10.00 points**

No one can fool himself or herself.

- $\forall xF(\neg x, \neg x)$
- $\neg\exists xF(\neg x, x)$
- $\neg\exists xF(x, x)$
- $\exists xF(\neg x, \neg x)$
- $\neg\forall xF(x, x)$

Multiple Choice	Chapter: 01 The Foundations: Logic and Proofs	Section: 01.05 Nested Quantifiers

26. award: **8 out of 10.00 points**

There is someone who can fool exactly one person besides himself or herself.

- $\exists x\exists y(x \neq y \wedge F(x, y))$
- $\forall y((F(x, y) \wedge y \neq x) \rightarrow F(x, y))$
- $\exists x\exists y (x \neq y \wedge F(x, y) \wedge \forall z((F(x, z) \wedge z \neq x) \rightarrow z = y))$
- $\exists x\forall y(\neq y \wedge F(x, y))$
- $\exists x\forall y(F(x, y) \leftrightarrow x \neq y)$

Multiple Choice	Chapter: 01 The Foundations: Logic and Proofs	Section: 01.05 Nested Quantifiers

Express each of these statements using mathematical and logical operators, predicates, and quantifiers, where the domain consists of all integers.

Section Break	Chapter: 01 The Foundations: Logic and Proofs	Section: 01.05 Nested Quantifiers

27. award:
8 out of 10.00 points

The sum of two negative integers is negative.

- $\exists x \exists y((x > 0) \land (y > 0) \to (x + y > 0))$
- $\forall x \exists y((x < 0) \land (y < 0) \to (x + y < 0))$
- $\exists x \forall y((x < 0) \land (y < 0) \to (x + y < 0))$
- $\forall x \forall y((x < 0) \land (y < 0) \to (x + y < 0))$
- $\forall x \forall y((x > 0) \land (y > 0) \to (x + y > 0))$

Multiple Choice	Chapter: 01 The Foundations: Logic and Proofs	Section: 01.05 Nested Quantifiers

28. award:
0 out of 10.00 points

The difference of two positive integers is not necessarily positive.

- $\forall x \forall y((x > 0) \land (y > 0) \land (x - y \le 0))$
- $\exists x \forall y((x > 0) \land (y > 0) \land (x - y \le 0))$
- $\exists x \exists y((x > 0) \land (y > 0) \land (x - y \le 0))$
- $\forall x \exists y((x > 0) \land (y > 0) \land (x - y \le 0))$
- $\exists x \exists y((x > 0) \land (y > 0) \land (x - y < 0))$

Multiple Choice	Chapter: 01 The Foundations: Logic and Proofs	Section: 01.05 Nested Quantifiers

29. award:
8 out of 10.00 points

The sum of the squares of two integers is greater than or equal to the square of their sum.

- $\forall x \forall y\, (x^2 + y^2 > (x + y)^2)$
- $\forall x \exists y\, (x^2 + y^2 \ge (x + y)^2)$
- $\exists x \forall y\, (x^2 + y^2 \ge (x + y)^2)$
- $\forall x \forall y\, (x^2 + y^2 \ge (x + y)^2)$
- $\exists x \exists y\, (x^2 + y^2 > (x + y)^2)$

Multiple Choice	Chapter: 01 The Foundations: Logic and Proofs	Section: 01.05 Nested Quantifiers

30. award:
8 out of
10.00 points

The absolute value of the product of two integers is the product of their absolute values.

- (selected, correct) $\forall x \forall y\, (|xy| = |x||y|)$
- $\exists x \exists y\, (|xy| \neq |x||y|)$
- $\exists x \forall y\, (|xy| = |x||y|)$
- $\forall x \forall y\, (|xy| \neq |x||y|)$
- $\forall x \exists y\, (|xy| \neq |x||y|)$

Multiple Choice	Chapter: 01 The Foundations: Logic and Proofs	Section: 01.05 Nested Quantifiers

Express each of these statements using predicates, quantifiers, logical connectives, and mathematical operators where the domain consists of all integers.

Section Break	Chapter: 01 The Foundations: Logic and Proofs	Section: 01.05 Nested Quantifiers

31. award:
0 out of
10.00 points

The product of two negative integers is positive.

- (selected, incorrect) $\forall x \forall y((x < 0) \wedge (y < 0) \leftrightarrow (xy > 0))$
- $\exists x \exists y((x < 0) \wedge (y < 0) \leftrightarrow (xy > 0))$
- → $\forall x \forall y((x < 0) \wedge (y < 0) \rightarrow (xy > 0))$
- $\exists x \exists y((x < 0) \wedge (y < 0) \rightarrow (xy > 0))$
- $\forall x \forall y((x < 0) \vee (y < 0) \rightarrow (xy > 0))$

Multiple Choice	Chapter: 01 The Foundations: Logic and Proofs	Section: 01.05 Nested Quantifiers

32. award:
0 out of
10.00 points

The average of two positive integers is positive.

- $\forall x \forall y((x < 0) \wedge (y < 0) \rightarrow ((x + y)/2 > 0))$
- $\exists x \exists y((x > 0) \wedge (y > 0) \wedge ((x + y)/2 > 0))$
- → $\forall x \forall y((x > 0) \wedge (y > 0) \rightarrow ((x + y)/2 > 0))$
- $\exists x \exists y((x < 0) \wedge (y < 0) \rightarrow ((x + y)/2 > 0))$
- (selected, incorrect) $\forall x \forall y((x > 0) \wedge (y > 0) \wedge ((x + y)/2 > 0))$

Multiple Choice	Chapter: 01 The Foundations: Logic and Proofs	Section: 01.05 Nested Quantifiers

33. award:
8 out of
10.00 points

The difference of two negative integers is not necessarily negative.

- $\exists x \exists y((x > 0) \vee (y > 0) \vee (x - y \geq 0))$
- $\exists x \exists y((x < 0) \wedge (y < 0) \wedge (x - y \geq 0))$
- $\exists x \exists y((x < 0) \wedge (y < 0) \wedge (x - y \leq 0))$
- $\exists x \exists y((x < 0) \vee (y < 0) \wedge (x - y \geq 0))$
- $\exists x \exists y((x < 0) \wedge (y < 0) \vee (x - y \geq 0))$

Multiple Choice	Chapter: 01 The Foundations: Logic and Proofs	Section: 01.05 Nested Quantifiers

34. award:
0 out of
10.00 points

The absolute value of the sum of two integers does not exceed the sum of the absolute values of these integers.

- $\exists x \exists y (|x + y| \leq |x| + |y|)$
- → $\forall x \forall y (|x + y| \leq |x| + |y|)$
- $\forall x \forall y (\neg|x + y| \geq |x| + |y|)$
- $\exists x \exists y \neg(|x + y| \leq |x| + |y|)$

Multiple Choice	Chapter: 01 The Foundations: Logic and Proofs	Section: 01.05 Nested Quantifiers

What rule of inference is used in each of these arguments?

Section Break	Chapter: 01 The Foundations: Logic and Proofs	Section: 01.06 Rules of Inference

35. award:
0 out of
10.00 points

a) Alice is a mathematics major. Therefore, Alice is either a mathematics major or a computer science major.

- Addition
- Disjunctive syllogism
- Conjunction
- Modus tollens
- Resolution
- Hypothetical syllogism
- Modus ponens
- Simplification

This is the addition rule. We are concluding from *p* that $p \lor q$ must be true, where *p* is "Alice is a mathematics major" and *q* is "Alice is a computer science major."

Multiple Choice	Chapter: 01 The Foundations: Logic and Proofs	Section: 01.06 Rules of Inference

36. award:
0 out of
10.00 points

b) Jerry is a mathematics major and a computer science major. Therefore, Jerry is a mathematics major.

- Modus ponens
- Simplification
- Modus tollens
- Addition
- Hypothetical syllogism
- Conjunction
- Disjunctive syllogism
- Resolution

This is the simplification rule. We are concluding from $p \land q$ that *p* must be true, where *p* is "Jerry is a mathematics major" and *q* is "Jerry is a computer science major."

Multiple Choice	Chapter: 01 The Foundations: Logic and Proofs	Section: 01.06 Rules of Inference

37. award:
0 out of
10.00 points

c) If it is rainy, then the pool will be closed. It is rainy. Therefore, the pool is closed.

- Hypothetical syllogism
- → Modus ponens
- Resolution
- ✗ Modus tollens (selected)
- Addition
- Conjunction
- Disjunctive syllogism
- Simplification

This is modus ponens. We are concluding from $p \rightarrow q$ and p that q must be true, where p is “it is rainy” and q is “the pool will be closed.”

Multiple Choice	Chapter: 01 The Foundations: Logic and Proofs	Section: 01.06 Rules of Inference

38. award:
8 out of
10.00 points

d) If it snows today, the university will close. The university is not closed today. Therefore, it did not snow today.

- Simplification
- ✓ Modus tollens (selected)
- Modus ponens
- Addition
- Conjunction
- Resolution
- Disjunctive syllogism
- Hypothetical syllogism

This is modus tollens. We are concluding from $p \rightarrow q$ and ¬q that $\neg p$ must be true, where p is “it will snow today” and q is “the university will close today.”

Multiple Choice	Chapter: 01 The Foundations: Logic and Proofs	Section: 01.06 Rules of Inference

39. award:
0 out of 10.00 points

e) If I go swimming, then I will stay in the sun too long. If I stay in the sun too long, then I will sunburn. Therefore, if I go swimming, then I will sunburn.

- Resolution
- → Hypothetical syllogism
- ✗ Simplification (selected)
- Conjunction
- Addition
- Disjunctive syllogism
- Modus tollens
- Modus ponens

This is hypothetical syllogism. We are concluding from $p \rightarrow q$ and $q \rightarrow r$ that $p \rightarrow r$ must be true, where p is "I will go swimming," q is "I will stay in the sun too long," and r is "I will sunburn."

Multiple Choice	Chapter: 01 The Foundations: Logic and Proofs	Section: 01.06 Rules of Inference

For each of these arguments determine whether the argument is correct or incorrect with reason.

Section Break	Chapter: 01 The Foundations: Logic and Proofs	Section: 01.06 Rules of Inference

40. award:
8 out of 10.00 points

All students in this class understand logic. Xavier is a student in this class. Therefore, Xavier understands logic.

- Invalid: fallacy of denying the hypothesis
- ✓ Correct, using universal instantiation and modus ponens (selected)
- Invalid: fallacy of affirming the conclusions
- Correct, using universal instantiation and modus tollens
- Correct, using universal instantiation and disjunctive syllogism

Multiple Choice	Chapter: 01 The Foundations: Logic and Proofs	Section: 01.06 Rules of Inference

41. award:
8 out of 10.00 points

Every computer science major takes discrete mathematics. Natasha is taking discrete mathematics. Therefore, Natasha is a computer science major.

- Correct, using universal instantiation and modus tollens
- Correct, using universal instantiation and disjunctive syllogism
- Invalid: fallacy of affirming the conclusions
- Invalid: fallacy of denying the hypothesis
- Correct, using universal instantiation and modus ponens

Multiple Choice	Chapter: 01 The Foundations: Logic and Proofs	Section: 01.06 Rules of Inference

42. award:
0 out of 10.00 points

All parrots like fruit. My pet bird is not a parrot. Therefore, my pet bird does not like fruit.

- Correct, using universal instantiation and modus ponens
- → Invalid: fallacy of denying the hypothesis
- Correct, using universal instantiation and disjunctive syllogism
- Invalid: fallacy of affirming the conclusions
- Correct, using universal instantiation and modus tollens

Multiple Choice	Chapter: 01 The Foundations: Logic and Proofs	Section: 01.06 Rules of Inference

43. award:
0 out of 10.00 points

Everyone who eats granola every day is healthy. Linda is not healthy. Therefore, Linda does not eat granola every day.

- Invalid: fallacy of affirming the conclusions
- Invalid: fallacy of denying the hypothesis
- → Correct, using universal instantiation and modus tollens
- Correct, using universal instantiation and disjunctive syllogism
- Correct, using universal instantiation and modus ponens

Multiple Choice	Chapter: 01 The Foundations: Logic and Proofs	Section: 01.06 Rules of Inference

Determine whether each of these arguments is valid. If an argument is correct, what rule of inference is being used? If it is not, what logical error occurs?

Section Break	Chapter: 01 The Foundations: Logic and Proofs	Section: 01.06 Rules of Inference

44.

award:
8 out of
10.00 points

If n is a real number such that $n > 1$, then $n^2 > 1$. Suppose that $n^2 > 1$. Then $n > 1$.

- Fallacy of affirming the conclusion
- Valid argument using modus ponens
- Fallacy of denying the hypothesis
- Fallacy of begging the question
- Valid argument using modus tollens

Multiple Choice	Chapter: 01 The Foundations: Logic and Proofs	Section: 01.06 Rules of Inference

45.

award:
0 out of
10.00 points

If n is a real number with $n > 3$, then $n^2 > 9$. Suppose that $n^2 \leq 9$. Then $n \leq 3$.

- Fallacy of affirming the conclusion
- Fallacy of begging the question
- Valid argument using modus ponens
- → Valid argument using modus tollens
- Fallacy of denying the hypothesis

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46.

award:
0 out of
10.00 points

If n is a real number with $n > 2$, then $n^2 > 4$. Suppose that $n \leq 2$. Then $n^2 \leq 4$.

- Valid argument using modus ponens
- Valid argument using modus tollens
- Fallacy of begging the question
- → Fallacy of denying the hypothesis
- Fallacy of affirming the conclusion

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47.

award:
0 out of
10.00 points

Identify the steps that have error in the following argument that supposedly shows that if $\forall x(P(x) \vee Q(x))$ is true then $(\forall xP(x)) \vee (\forall xQ(x))$.

Step	Reason
1. $\forall x(P(x) \vee Q(x))$	Premise
2. $P(c) \vee Q(c)$	Universal instantiation from (1)
3. $P(c)$ for arbitrary c	Simplification from (2)
4. $\forall xP(x)$	Universal generalization from (3)
5. $Q(c)$ for arbitrary c	Simplification from (2)
6. $\forall xQ(x)$	Universal generalization from (5)
7. $(\forall xP(x)) \vee (\forall xQ(x))$	Disjunction from (4) and (6)

- [ ] Step 2
- [ ] Step 3
- [x] Step 4
- [ ] Step 5
- [ ] Step 6

Check All That Apply Chapter: 01 The Foundations: Logic and Proofs Section: 01.06 Rules of Inference

48.

award:
8 out of
10.00 points

Identify the error in steps 3 and 5 in this argument that supposedly shows that if $\forall x(P(x) \vee Q(x))$ is true then $(\forall xP(x)) \vee (\forall xQ(x))$.

Step	Reason
1. $\forall x(P(x) \vee Q(x))$	Premise
2. $P(c) \vee Q(c)$	Universal instantiation from (1)
3. $P(c)$ for arbitrary c	Simplification from (2)
4. $\forall xP(x)$	Universal generalization from (3)
5. $Q(c)$ for arbitrary c	Simplification from (2)
6. $\forall xQ(x)$	Universal generalization from (5)
7. $(\forall xP(x)) \vee (\forall xQ(x))$	Disjunction from (4) and (6)

- ○ Simplification applies to disjunctions, not conjunctions.
- ○ The conclusion follows from conjunctions, not simplification.
- ○ The conclusion follows from hypothetical syllogism, not simplification.
- ◉ Simplification applies to conjunctions, not disjunctions.
- ○ The conclusion follows from disjunctive syllogism, not from simplification.

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