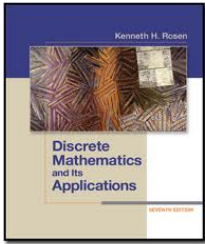


Peer Instruction #6: Inference Rules



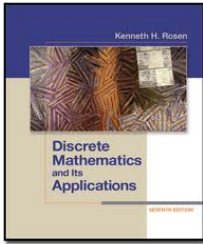
Which rows of the following truth table prove Modus Tollens?

Prove $p \rightarrow q, \neg q \therefore \neg p$

p	q	$\neg p$	$\neg q$	$p \rightarrow q$
true	true	false	false	true
true	false	false	true	false
false	true	true	false	true
false	false	true	true	true

- A. First
- B. Second
- C. Third
- D. Fourth
- E. Need all rows!

Equivalence Proof



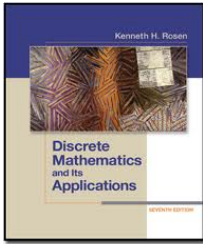
Which columns must be compared to prove the Absorption Law?

Prove $p \vee (p \wedge q) \equiv p$

p	q	$p \wedge q$	$p \vee (p \wedge q)$
true	true	true	true
true	false	false	true
false	true	true	false
false	false	true	false

- A. First and fourth
- B. Third and fourth
- C. First and third
- D. Second and third
- E. Need all columns!

Equivalence Proof



What are the negation of the following two predicate logic statements?

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

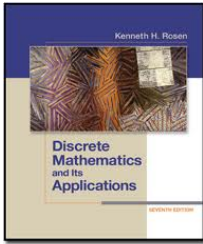
A. $\exists x \neg P(x), \neg \forall x P(x)$

B. $\neg \exists x P(x), \neg \forall x P(x)$

C. $\exists x \neg P(x), \forall x P(x)$

D. $\neg \exists x P(x), \forall x P(x)$

E. None of the above



Given the following axioms, which of the following conclusions can we prove?

Axioms

$$p \rightarrow q$$

$$q \rightarrow r$$

$$\neg r$$

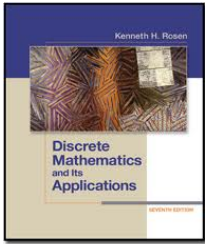
A. $\neg p$

B. $\neg p \wedge \neg q$

C. $\neg p \wedge \neg r$

D. All of the above

E. None of the above



Given the following axioms, which of the following conclusions can we prove?

Axioms

$$p \oplus r$$

$$r \rightarrow (\neg q \leftrightarrow p)$$

$$\neg p$$

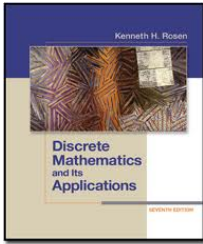
A. q

B. $q \wedge r$

C. $q \vee s$

D. All of the above

E. None of the above



Given the following axioms, which of the following conclusions can we prove?

Axioms

$$p \rightarrow \neg q$$

$$\neg q \rightarrow r$$

$$r \rightarrow (s \oplus q)$$

$$p$$

A. $(s \vee t) \wedge \neg q$

B. $(s \wedge t) \wedge \neg q$

C. $(s \oplus \neg q)$

D. All of the above

E. None of the above