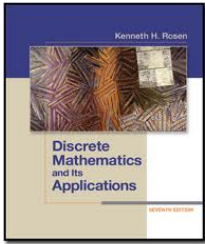
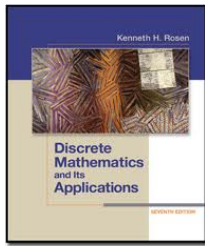


Peer Instruction #5: Propositional Logic



Which of the following statements is not a proposition?

- A. Java variable names must be capitalized.
- B. $10 + (x - 3) = 20$
- C. Math sets disallow duplicate members.
- D. $30 - (3 * 6) = 12$
- E. Some propositions are both true and false.

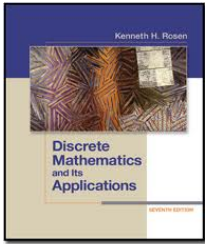


Fill in the missing entries in the truth table for p implies q .

p	q	$p \rightarrow q$
true	true	true
true	false	?
false	true	?
false	false	true

- A. true, true
- B. true, false
- C. false, true
- D. false, false

Implication



What are the values of p and q for the following statements?

$$x = F$$

$$y = \neg(T \wedge x)$$

$$z = y \oplus (T \vee y)$$

$$p = \neg x \rightarrow ((y \wedge z) \vee \neg z)$$

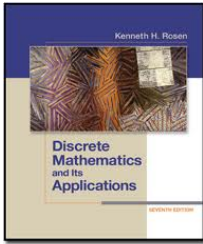
$$q = (p \wedge y) \leftrightarrow (p \oplus \neg x)$$

A. true, true

B. true, false

C. false, true

D. false, false

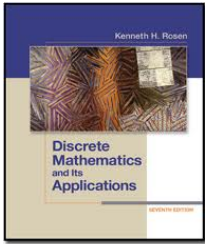


Which step of the following proof is wrong?

Prove $p \rightarrow q \equiv F \wedge (q \vee \neg p)$:

- | | | |
|-------------------------------|-------------------|---------|
| 1. $p \rightarrow q$ | - Given | A. 1 |
| 2. $\neg p \vee q$ | - Implication Law | B. 2 |
| 3. $q \vee \neg p$ | - Commutative Law | C. 3 |
| 4. $F \wedge (q \vee \neg p)$ | - Identity Law | D. 4 |
| | | E. None |

Equivalence Proof

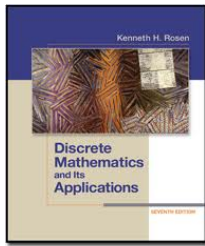


Which row of the following truth table proves Modus Ponens?

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

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

- A. first line
- B. second line
- C. third line
- D. fourth line
- E. Need multiple lines!



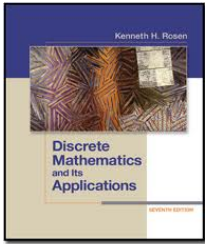
Use a truth table to decide whether the following equivalence is true or false.

Prove $p \leftrightarrow q \equiv \neg (q \oplus p)$

p	q	$p \leftrightarrow q$	$\neg (q \oplus p)$
true	true	true	
true	false	false	
false	true	false	
false	false	true	

- A. true
- B. false
- C. indeterminate

Truth Table Proof



Use any method to prove or disprove the logical equivalence below:

Prove $p \rightarrow q \equiv q \rightarrow p$

- A. true
- B. false
- C. indeterminate