

Solutions

Geometry #9: Logical Statements
Booklet

Let p represent "It is cold" and let q represent "It is snowing." Which expression can be used to represent "It is cold and it is not snowing"?

- (1) $\sim p \wedge q$ (2) $p \wedge \sim q$ (3) $p \vee \sim q$ (4) $\sim p \vee q$

$P = \text{It is cold.}$

$Q = \text{It is snowing.}$

It is cold and it is not snowing

9. Each part that follows consists of a set of three sentences. The truth values of the first two sentences are given. Determine the truth value of the third sentence.

It rains or it is cold. F It is cold. T It rains. T	TRUE FALSE ?
b. The month is June and it is not warm. F The month is June. T It is warm. F	FALSE TRUE ?
c. I will study or I will not pass the test. T I will not study. F I will pass the test. F	TRUE ? F
d. I will not work at camp this summer or I will attend summer school. F I will work at camp this summer. T I will not attend summer school. T	FALSE TRUE ?
e. The month is not January and it is not snowing. F The month is January. T It is not snowing. T	? F TRUE TRUE

$P \wedge \sim Q$

P	Q	$P \wedge Q$
T	T	T
T	F	F
F	T	F
F	F	F

P	Q	$P \vee Q$
T	T	T
T	F	T
F	T	T
F	F	F

6. If $p \wedge \sim q$ is true, then which is true?

- (1) p and q are both true. (2) p is false and q is true.
(3) p is true and q is false. (4) p and q are both false.

→ If P and the negation of Q is true

→ $P = \text{true}$
 $\sim Q = \text{true}$

B. Show or explain how you arrived at your answer.

7. Let x represent "Mr. Ladd teaches mathematics" and let y represent "Mr. Ladd is the football coach." Write in symbolic form: "Mr. Ladd does not teach mathematics and Mr. Ladd is the football coach."

$x = \text{Mr. Ladd teaches Math}$

$y = \text{Mr. Ladd is football coach}$

Mr. Ladd does not teach math and he's football coach

$\sim x \wedge y$

$\sim x \wedge y$