

5.

p	q	r	$q \wedge r$	$p \Rightarrow (q \wedge r)$
T	T	T	T	T
T	T	F	F	F
T	F	T	F	F
T	F	F	F	F
F	T	T	T	T
F	T	F	F	T
F	F	T	F	T
F	F	F	F	T

8.6 Exercises

Concept Check

Fill-in-the-Blank. Complete each sentence using information found in this section.

1. A truth table describes the possible truth values of a _____.
2. A truth table organizes all possible _____ of truth values of the individual simple statements.
3. The number of _____ in a truth table varies depending on how many simple statements are involved.
4. The number of _____ in a truth table depends on the logical connectors used and whether any of the statements are negations.
5. A conjunction $p \wedge q$ is true only when both p and q are _____.
6. The conditional statement $p \Rightarrow q$ is false only when p is _____ and q is _____.

True/False. Determine whether each statement is true or false. If a statement is false, explain how it can be changed so the statement is true. (**Note:** There may be more than one acceptable change.)

7. A compound statement can have different truth values depending on the truth values of the simple statements it contains.
8. A disjunction $p \vee q$ is always true regardless of the truth values of p and q .
9. The number of columns in a truth table is increased when negations are involved.
10. A truth table must contain every possible combination of true and false for the simple statements involved.

Practice

Write each logical statement symbolically. Then, create a truth table for the statement.

1. He went to the store.
2. One mile is 5280 feet.
3. The teacher said this test isn't hard.
4. I did not watch television last night.
5. She did not want her favorite team to lose.
6. It is sunny and she has sunglasses.
7. My dog is asleep and I hear him snoring.
8. It is not New Year's Day and he is having a party.
9. It is raining and he doesn't want to go outside.
10. She did not go to the store and she did not buy anything.
11. The sky is blue or there are clouds.
12. The cell phone is charged or the battery is dead.
13. He has children or he does not have children.
14. She did not stay up late or she read a book.
15. He played baseball or she did not play softball.
16. The clock is not accurate or I am not on time.
17. If her son studies hard, she will make him cookies.
18. If he watches the first Harry Potter movie, then he has to watch all of them.
19. If I read Stephen King, then I cannot sleep at night.
20. If he doesn't go to the store today, then he has to go tomorrow.
21. If it does not rain, then I did not wash my car.
22. If I read Stephen King, then I will be awake all night and I will be tired tomorrow.
23. My dog is not awake and I hear him snoring, or my dog is awake.
24. If he doesn't go to the store today, then he has to go tomorrow or he will be hungry.
25. If it is raining and I have an umbrella, then I won't get wet.

Writing & Thinking

26. Why can't a truth table for "Stop the car!" be created?
27. A truth table with the last column consisting of all T values is called a tautology. Create a statement, like Exercise 13, that is a tautology.