

Logic Homework Exercises #1

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Name _____

Instructions. In exercises 1 - 4, let p be the statement: “The sun will shine,” and let q be the statement: “Spot will wag his tail.” Write each statement in symbolic form.

1. The sun will shine or spot will wag his tail.
2. The sun will shine and spot will not wag his tail.
3. Spot will wag his tail but the sun will not shine.
4. The sun will not shine or Spot will not wag his tail.

In exercises 5 - 8, let p be the statement: “Dick and Jane caught some fish,” and let q be the statement: “They will tell a whopper of a fish story.” Write each statement in words.

5. $p \vee q$
6. $p \wedge q$
7. $p \wedge \neg q$
8. $\neg p \vee \neg q$

In exercises 9 - 13, construct a truth table for the given statement.

9. $p \wedge \neg q$
10. $(p \vee q) \wedge (p \wedge \neg q)$
11. $(p \wedge \neg q) \vee (\neg p \wedge q)$
12. $(p \wedge \neg q) \vee (\neg r \wedge q)$
13. $(p \vee q) \wedge r$
14. (Ross & Wright, Discrete Math 2nd Ed.) Determine whether the following propositions are True or False:

- (a) If $2 + 2 = 4$, then $2 + 4 = 8$.

- (b) If $2 + 2 = 5$, then $2 + 4 = 8$.
- (c) If $2 + 2 = 4$, then $2 + 4 = 6$.
- (d) If $2 + 2 = 5$, then $2 + 4 = 6$.
- (e) If the earth is flat, then Julius Caesar was the first president of the United States.
- (f) If the earth is flat, then George Washington was the first president of the United States.
- (g) If George Washington was the first president of the United States, then the earth is flat.
- (h) If George Washington was the first president of the United States, then $2 + 2 = 4$.