Logic

In logic, a negation of a simple statement (one logical value) can usually be formed by placing the word "not" into the original statement.  The negation will always have the opposite truth value of the original statement.

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In logic, a conjunction is a compound sentence formed by combining two sentences (or facts) using the word "and." A conjunction is true only when BOTH sentences
(or facts) are true.

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In logic, a disjunction is a compound sentence formed by combining two sentences (or facts) using the word "or." A disjunction is true when EITHER or BOTH
sentences (or facts) are true.

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In logic, a conditional is a compound statement formed by combining two sentences (or facts) using the words "if ... then."   A conditional can also be called an implication

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 Your teacher tells you “if you participate in class, then you will get extra points.”

fact 1:   "you participate in class."
fact 2:   "you get participation points."

1. If you participate in class (fact 1 true) and you get extra points (fact 2 true)
     then the teacher's statement is true.

2.  If you participate in class (fact 1 true) and you do not get extra points
    (fact 2 false), then the teacher did not tell the truth and the statement is false.

3.  If you do not participate in class (fact 1 false), we cannot judge the truth
    of the teacher's statement.  The teacher did not tell you what would happen
    if you did NOT participate in class.  Since we cannot accuse the teacher of
    making a false statement, we assign "true" to the statement.

"If you participate in class, then you will get extra points." will be true in all cases except one:
when you participate in class and you do NOT get the extra points.

In logic, a biconditional is a compound statement formed by combining two conditionals under "and."  Biconditionals are true when **both** statements (facts) have the **exact same truth value.**

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Truth value of open sentences:

1. Construct a truth table for        

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2. What is the contrapositive of the statement “If I study, then I pass the test”?

3. What statement is logically equivalent to “If it is Sunday, then I am not in school”?

4. What is the converse of the statement “If it is sunny, I will go swimming”?

5. What is the inverse of the statement “If Alex did his homework, then he will pass the test”?

6. Write a conclusion, and state the law of logic used:

 a. Cindy is a doctor or a lawyer.

 Cindy is not a lawyer.

 b. If I take my umbrella, it will not rain.

 I take my umbrella

 c. If I wear braces, I will have straight teeth.

 I wear braces

 d. If I save money, then I can rent a movie.

 I can’t rent a movie.

 e. If I play tennis, I will be late for dinner.

 If I am lat for dinner, I cannot go to the movies.

7. Given that  is true,  is false, and is true, determine the truth value for each

 statement.

 a.  b.  c.  d.  e. 