

Write the conclusion that can be made from the given pair of true statements. Then circle whether you used the Law of Detachment or Law of Syllogism to make your conclusion.

1. (a) If I win the lottery, then I will have a million dollars. Detachment
 (b) If I have a million dollars, then I will buy a boat. Syllogism

Conclusion: If I win the lottery, then I will buy a boat

2. (a) If Mr. Moyer is playing volleyball, then he is happy. Detachment
 (b) Mr. Moyer is playing volleyball. Syllogism

Conclusion: Mr. Moyer is happy

3. (a) If a figure is a square, then it is a rectangle. Detachment
 (b) If a figure is a rectangle, then it has 4 right angles. Syllogism

Conclusion: If a figure is a square, then it has 4 right angles

Decide whether inductive or deductive reasoning is used to reach the conclusion. Explain your reasoning.

4. For the past three Thursdays, the cafeteria has served hot ham and cheese sandwiches for lunch. Chelsea concludes that the cafeteria will serve hot ham and cheese sandwiches this Thursday.

Inductive: She used a pattern to make a prediction

5. If you go to Northern High School, then you must take geometry. Savannah goes to Northern High School. She concludes that she will have to take geometry.

Deductive: Based on fact (laws of logic)

6. Every geometry teacher that Phillip has known is totally awesome. Phillip concludes that all geometry teachers are awesome.

Inductive: He used a pattern to make a prediction

Describe the pattern in the numbers AND write the next number in the pattern

7. $1, 6, 4, 9, 7 \dots$ 12

The pattern is to add 5 to get the next number, then subtract 2 to get the next. Then repeat.

$7 + 5 = 12$

8. $3, 9, 27, 81 \dots$ 243

The pattern is to multiply by 3 to get the next number.

$81 \times 3 = 243$

Write the statement in the conditional. Then write the converse, inverse, and contrapositive.

9. Two lines that intersect form vertical angles.

$p \rightarrow q$ Conditional: If two lines intersect, then they form vertical angles.

$q \rightarrow p$ Converse: If you have vertical angles, then two lines intersect.

$\sim p \rightarrow \sim q$ Inverse: If two lines don't intersect, then they don't form vertical angles.

$\sim q \rightarrow \sim p$ Contrapositive: If you don't have vertical angles, then two lines don't intersect.

10. Any two angles that share a common side are adjacent.

Conditional: If two angles share a common side, then they are adjacent.

Converse: If two angles are adjacent, then they share a common side.

Inverse: If two angles don't share a common side, then they are not adjacent.

Contrapositive: If two angles are not adjacent, then they don't share a common side.

Write the definition as a bi-conditional statement.

11. A polygon that is convex has angles that are all less than 180° .

Biconditional: A polygon is convex if and only if it has angles all less than 180°

12. Complementary angles are two angles whose measures add to 90° .

Biconditional: Two angles are complementary if and only if their measures add to 90° .

Give a counterexample to the following statements.

13. All prime numbers are odd. 2 it is prime, but also even.

14. All sports use a ball. Badminton Sport that uses a shuttlecock

Re-write the statement in conditional form.

15. Two angles are congruent if they are vertical.

If two angles are vertical, then they are congruent.