

Use the **Law of Detachment** to make a valid conclusion in the situation.

1. If the measure of an angle is 90° , then it is a right angle. The measure of $\angle A$ is 90° .
2. If $x > 12$, then $-x < -12$. The value of x is 15.
3. If a book is a biography, then it is nonfiction. You are reading a biography.
4. If two angles are vertical angles, then they have the same measure. You know that $\angle 1$ and $\angle 2$ vertical angles.

Use the **Law of Syllogism** to write the statement that follows from the pair of statements that are given.

5. If a rectangle has four equal side lengths, then it is a square. If a polygon is a square, then it is a regular polygon.
6. If $y > 0$, then $2y > 0$. If $2y > 0$, then $2y - 5 \neq -5$.
7. If you play the clarinet, then you play a woodwind instrument. If you play a woodwind instrument, then you are a musician.
8. Describe and correct the error in the argument: "If two angles are a linear pair, then they are supplementary. Angles C and D are supplementary, so the angles are a linear pair."

What conclusions can you make using the true statement?

9. If you save at least \$2000, then you can buy a used car. You have saved \$1400.
10. The bakery makes a profit if its revenue is greater than its costs. You will get a raise if the bakery makes a profit.

Select the word(s) that make the conclusion true.

11. Mesa Verde National Park is in Colorado. Simone vacationed in Colorado. So Simone (*must have, may have or never*) visited Mesa Verde National Park.
12. The cliff dwellings in Mesa Verde National Park are accessible to visitors only when accompanied by a park ranger. Billy is at a cliff dwelling in Mesa Verde National Park. So, Billy (*is, may be, is not*) with a park ranger.

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

13. The rule at your school is that you must attend all of your classes in order to participate in sports after school. You played in a soccer game after school on Monday. Therefore, you went to all of your classes on Monday.
14. For the past 5 years, your neighbor goes on vacation every July 4th and asks you to feed her hamster. You conclude that you will be asked to feed her hamster on the next July 4th.

Use the true statements below to determine whether you know the conclusion is true or false. Explain your reasoning.

If Arlo goes to the baseball game, then he will buy a hot dog.
If the baseball game is not sold out, then Arlo and Mia will go to the game.
If Mia goes to the baseball game, she will buy popcorn.
The baseball game is not sold out.

15. Mia bought a hot dog.
16. Arlo had some of Mia's popcorn.
17. Arlo bought a hot dog.
18. Arlo and Mia went to the game.

Determine if statement (3) follows from statements (1) and (2) by either the Law of Detachment or the Law of Syllogism. If it does, state which law was used. If not, write invalid.

19. (1) If you order the apple pie, then it will be served with ice cream
(2) Matthew ordered the apple pie.
(3) Matthew was served ice cream.
20. (1) If $\angle 2$ is acute, then $\angle 3$ obtuse.
(2) If $\angle 3$ is obtuse, then $\angle 4$ acute.
(3) If $\angle 2$ is acute, then $\angle 4$ acute.