



## Example 2

### The Law of Detachment

- b. **Given:** If Dakota goes to the video game store, then he will buy a new game.  
Dakota went to the video game store this afternoon.

**Conclusion:** Dakota bought a new game.

- A. Invalid; because the statement *Dakota bought a new game* does not satisfy the hypothesis of the conditional statement, the conclusion is not true.
- B. Valid; because the statement *Dakota went to the video game store this afternoon* satisfies the conclusion of the conditional statement, the hypothesis of the conditional is true.
- C. Valid; because the statement *Dakota went to the video game store this afternoon* satisfies the hypothesis of the conditional statement, the conclusion is true.
- D. Invalid; because the statement *Dakota went to the video game store this afternoon* satisfies only the hypothesis, the conclusion is not true.



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## Learn

### The Law of Syllogism

One law that is related to deductive reasoning is the Law of Syllogism. This law allows you to draw conclusions from two true conditional statements when the conclusion of one statement is the hypothesis of the other.

### Key Concept: Law of Syllogism

**Words**


If  $p \rightarrow q$  and  $q \rightarrow r$  are true statements, then



	$p \rightarrow r$ is a true statement.
Example	Given: $P$ If you get a job, then you will earn money.
	$Q$ If you earn money, then you will buy a car. $R$
	Valid Conclusion: If you get a job, then you will buy a car.

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### Example 3

#### The Law of Syllogism

**SLEEP** Scientists have found that the quality and amount of sleep greatly impact learning and memory. Lack of sleep causes students to have trouble focusing and receiving new information. Sleep deprivation also makes it difficult to retrieve previously learned information. Draw a valid conclusion from the given statements, if possible.

Given:  $Q$  If you are tired, then you will not do well on your test.  $R$

If you do not get enough sleep, then you will be tired.

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### Example 3

#### The Law of Syllogism

**Step 1** Identify the hypothesis and conclusion that are the same.

Determine whether the conclusion of one statement is the hypothesis of the other statement.

Given:  $Q$  If you are tired, then you will not do well on your test.

If you do not get enough sleep, then you will be tired.  $Q$

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### Example 3

#### The Law of Syllogism

Reorder the given statements so the conclusion of the first statement is the hypothesis of the second statement. This will allow you to make a valid conclusion using the Law of Syllogism.

Hypot- P

Given: If you do not get enough sleep,

Q then you will be tired.

If you are tired, then you will not do well on your test.

p: You do not get enough sleep.

q: You will be tired.

r: You will not do well on your test.



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### Example 3

The Law of Syllogism

#### Step 2 Represent the statements with symbols.

Let  $p$ ,  $q$ , and  $r$  represent the parts of the given conditional statements. Analyze the logic of the given conditional statements using symbols.

Statement 1:  $p \rightarrow q$

Statement 2:  $q \rightarrow r$

Because both statements are true and the conclusion of the first statement is the hypothesis of the second statement,  $p \rightarrow r$  by the Law of Syllogism. A valid conclusion is *If you do not get enough sleep, then you will not do well on your test.*



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### Example 3

The Law of Syllogism

#### Check

**GRAND CANYON** The Grand Canyon covers an area of 1900 square miles and contains 277 miles of the Colorado River. Since the Grand Canyon became a national park in 1919, over 193 million people have visited.

Draw a valid conclusion from the given statements, if possible.

**Given:** If Ebony takes a vacation, then she will go to the Grand Canyon. If Ebony goes to the Grand Canyon, then she will hike to the Colorado River.







### Example 3

#### The Law of Syllogism

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**Given:** If Ebony takes a vacation, then she will go to the Grand Canyon. If Ebony goes to the Grand Canyon, then she will hike to the Colorado River.

**If Ebony takes a vacation, then she will hike to the Colorado River.**