

2.5 If-Then Statements and Deductive Reasoning

An if-then statement has two parts.

The 'if' part contains the hypothesis.

The 'then' part contains the conclusion.

Example 1: Identify the hypothesis and conclusion.

If I sleep through my alarm, then I will miss the school bus.

Hypothesis: I sleep through my alarm

Conclusion: I will miss the school bus

Example 2: Rewrite the statement as an if-then statement.

Every duck on the pond is hungry.

If a duck is on the pond, then it is hungry.

I will go running if it does not snow.

If it does not snow, then I will go running.

Deductive reasoning uses facts, definitions, accepted properties, and the laws of logic to make a logical argument.

Law of Detachment: If the hypothesis of a true if-then statement is true, then the conclusion is also true.

Law of Syllogism:

If statement p, then statement q.

If statement q, then statement r.

If statement p, then statement r.

If these statements are true,

then this statement is true.

Example 1: What can you conclude from the following true statements?

If you wash the cotton T-shirt in hot water, then it will shrink.

You wash the cotton T-shirt in hot water.

The T-shirt will shrink.

Example 2: Checkpoint problems 3 and 4 on the bottom of pg. 83.

If x has a value of 7, then $2x-3$ has a value of 11.

The value of x is 7.

$2x-3$ had a value of 11.

If you study at least two hours for the test, then you will pass the test.

You study three hours for the test. ●

You will pass the test.

Example 3: Checkpoint in the middle of pg. 84.

If Naomi saves enough money, **then she can buy a concert ticket.**

If she buys a concert ticket, then she can see her favorite band.

If Naomi saves enough money, then she can see her favorite band.

If the ball is thrown at the window, **it will hit the window.**

If the ball hits the window, then the window will break.

If the ball is thrown at the window, then the window will break.

Example 4: Write the statement that follows from the pair of true statements.

- ① If the daily high temperature is 32 degrees F or less, then the water in the pipe is frozen.
- ② If the water in the pipe is frozen, then the pipe will break.

If the daily high temperature is 32 degrees F or less, then the pipe will break.

Example 5: Checkpoint on the bottom of pg. 84.

Name

2.5

pg. 85-87 # 1-20

22

23

28

Notes 2.6