

2-2

Conditional Statements



Vocabulary

Review

Underline the *conclusion* of each statement.

1. If the weather is nice, we will go swimming.
2. If I ride my bike to softball practice, then I will get there on time.

Vocabulary Builder

converse (noun) KAHN VURS

Related Words: convert, conversion

Definition: The **converse** of something is its opposite.

Word Source: The prefix *con-*, which means “together,” and *vertere*, which means “to turn,” come from Latin. So, a **converse** involves changing the order of more than one thing.

Use Your Vocabulary

Finish writing the *converse* of each statement.

3. **Statement:** If I study, then I pass the Geometry test.

Converse: If ?, then I study.

4. **Statement:** If I am happy, then I laugh.

Converse: If ?, then ?.

5. **Statement:** If I have a summer job, then I can buy a new bicycle.

Converse: ?.

Key Concept Conditional Statements

Definition

A **conditional** is an **if-then** statement.

The **hypothesis** is the part p following **if**.

The **conclusion** is the part q following **then**.

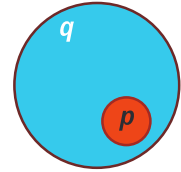
Symbols

$$p \rightarrow q$$

Read as “If p then q ”

or “ p implies q .”

Diagram



6. If $p = \text{tears}$ and $q = \text{sadness}$, what are two ways to read $p \rightarrow q$?



Problem 1 Identifying the Hypothesis and the Conclusion

Got It? What are the hypothesis and the conclusion of the conditional?

If an angle measures 130, then the angle is obtuse.

Complete each sentence with *if* or *then*.

7. The hypothesis is the part following ?.

8. The conclusion is the part following ?.

9. Circle the hypothesis. Underline the conclusion.

If an angle measures 130, then the angle is obtuse.



Problem 2 Writing a Conditional

Got It? How can you write “Dolphins are mammals” as a conditional?

10. Circle the correct statement.

All dolphins are mammals.

All mammals are dolphins.

Underline the correct words to complete each statement.

11. The set of dolphins / mammals is inside the set of dolphins / mammals.

12. The smaller/larger set is the hypothesis and the smaller / larger set is the conclusion.

13. Use your answers to Exercises 11 and 12 to write the conditional.

If ?, then ?.

If an animal is _____,

then it is _____.



Problem 3 Finding the Truth Value of a Conditional

Got It? Is the conditional true or false? If it is false, find a counterexample.

If a month has 28 days, then it is February.

14. Cross out the month(s) that have at least 28 days.

January	February	March	April	May	June
July	August	September	October	November	December

15. Is the conditional true or false? Explain.

Take note

Key Concept Related Conditional Statements

Statement	How to Write It	Symbols	How to Read It
Conditional	Use the given hypothesis and conclusion .	$p \rightarrow q$	If p , then q .
Converse	Exchange the hypothesis and the conclusion .	$q \rightarrow p$	If q , then p .
Inverse	Negate both the hypothesis and the conclusion of the conditional.	$\neg p \rightarrow \neg q$	If not p , then not q .
Contrapositive	Negate both the hypothesis and the conclusion of the converse.	$\neg q \rightarrow \neg p$	If not q , then not p .

Use the statement below to write each conditional.

A measures 98°, so **A is obtuse**.

16. Conditional If **A measures 98°**, then **A is obtuse**.

If **A measures 98°**, then _____.

17. Converse If **A is obtuse**, then **A measures 98°**.

If _____, then _____.

18. Inverse If not **A is obtuse**, then not **A measures 98°**.

If _____,

then _____.

19. Contrapositive If not **A measures 98°**, then not **A is obtuse**.

If _____,

then _____.



Problem 4 Writing and Finding Truth Values of Statements

Got It? What are the converse, inverse, and contrapositive of the conditional statement below? What are the truth values of each? If a statement is false, give a counterexample.

If a vegetable is a carrot, then it contains beta carotene.

20. Converse: If a vegetable contains beta carotene, then ?.

21. Inverse: If a vegetable is not a carrot, then ?.

22. Contrapositive: If a vegetable does not contain beta carotene, then ?.

23. The converse is true / false . The inverse is true / false . The contrapositive is true / false .

24. Give counterexamples for the statements that are false.



Lesson Check • Do you UNDERSTAND?

Error Analysis Your classmate rewrote the statement “You jog every Sunday” as “If you jog, then it is Sunday.” What is your classmate’s error? Correct it.

25. Circle the hypothesis and underline the conclusion of your classmate’s conditional.

If you jog, then it is Sunday.

26. Circle the counterexample for your classmate’s conditional.

You don’t jog, and it is not Sunday.

You also jog on Saturday.

27. Write the conditional that best represents “You jog every Sunday.”



Math Success

Check off the vocabulary words that you understand.

conditional

hypothesis

conclusion

Rate how well you can write conditional statements.

