Biconditionals and Definitions

Vocabulary

● Review

Underline the *hypothesis* in each statement.

1. If it rains on Friday, I won't have to cut the grass on Saturday.

2. If I go to sleep early tonight, then I won't be late for school tomorrow.

3. A triangle is equilateral if it has three congruent sides.

4. I'll know how to write biconditionals if I can identify a hypothesis and a conclusion.

● Vocabulary Builder

bi- (prefix) **by**

Definition: *bi-* is a prefix that means having two.

Examples: A *bicycle* has two wheels. Someone who is *bilingual* speaks two languages fluently.

● Use Your Vocabulary

Draw a line from each word in Column A to its meaning in Column B.

Column A	Column B
5. biannually (adverb)	occurring every two hundred years
6. biathlon (noun)	a two-footed animal
7. bicentennial (adjective)	having two coasts
8. bicoastal (adjective)	supported by two parties
9. biped (noun)	occurring every two weeks
10. bipartisan (adjective)	occurring every two years
11. biplane (noun)	a plane with two sets of wings
12. biweekly (adjective)	a two-event athletic contest

Key Concept   Bidirectional Statements

A *biconditional* combines $p \rightarrow q$ and $q \rightarrow p$ as $p \leftrightarrow q$.

You read $p \leftrightarrow q$ as "p if and only if q."

13. Complete the biconditional.

A ray is an angle bisector __?__ it divides an angle into two congruent angles.

_____

Problem 1   Writing a Biconditional

Got It? What is the converse of the following true conditional? If the converse is also true, rewrite the statements as a biconditional.

If two angles have equal measure, then the angles are congruent.

14. Identify the hypothesis (p) and the conclusion (q).

p: _____ q: _____

15. Circle the converse ($q \rightarrow p$) of the conditional.

| If two angles do *not* have equal measure, then the angles are *not* congruent. | If two angles are congruent, then the angles have equal measure. | If two angles are *not* congruent, then the angles do *not* have equal measure. |

16. Now write the statements as a biconditional ($p \leftrightarrow q$).

_____ if and only if _____.

Problem 2   Identifying the Conditionals in a Biconditional

Got It? What are the two conditionals that form this biconditional?

Two numbers are reciprocals if and only if their product is 1.

17. Identify p and q.

p: _____ q: _____

18. Write the conditional $p \rightarrow q$.

If _____,

then _____.

19. Write the conditional $q \rightarrow p$.

If _____,

then _____.

Problem 3 Writing a Definition as a Biconditional

Got It? **Is this definition of *straight angle* reversible? If yes, write it as a
true biconditional.**

> **A straight angle is an angle that measures 180.**

20. *Reversible* means you can reverse *p* and [ ] in the conditional.

21. Write the conditional.

If _____ ,

then _____ .

22. Write the converse.

If _____ ,

then _____ .

23. Write the biconditional.

_____ ,

if and only if _____ .

Problem 4 Identifying Good Definitions

Got It? **Is the following statement a good definition? Explain.**

> **A square is a figure with four right angles.**

24. Write the *conditional*.

_____

_____

25. Write the *converse*.

_____

_____

26. Which statement is true, the *conditional*, the *converse*, or *both*?

_____

27. Is the definition of a square a good definition? Explain.

_____

_____

Lesson Check • Do you UNDERSTAND?

Compare and Contrast Which of the following statements is a better definition of a linear pair?

A linear pair is a pair of supplementary angles.

A linear pair is a pair of adjacent angles with noncommon sides that are opposite rays.

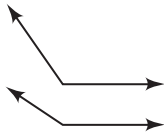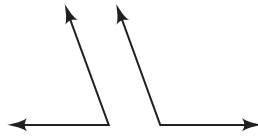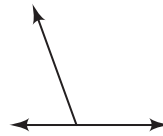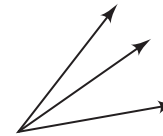**Use the figures below for Exercises 28–31.**

Figure 1   Figure 2   Figure 3   Figure 4

Underline the correct number or numbers to complete each sentence.

28. Figure(s) 1 / 2 / 3 / 4 show(s) linear pairs.

29. Figure(s) 1 / 2 / 3 / 4 show(s) supplementary angles.

30. Figure(s) 1 / 2 / 3 / 4 show(s) adjacent angles.

31. Figure(s) 1 / 2 / 3 / 4 show(s) adjacent angles whose noncommon sides are opposite rays.

32. Underline the correct word to complete the sentence.

Supplementary angles are always / sometimes / never linear pairs.

33. Write the better definition of a linear pair.

_____

_____

_____

Math Success

Check off the vocabulary words that you understand.

☐ biconditional   ☐ conditional   ☐ hypothesis   ☐ conclusion

Rate how well you can *use biconditionals*.

Need to review   0   2   4   6   8   10   Now I get it!

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