

GUIDED PRACTICE

Vocabulary Check ✓

Concept Check ✓

- Describe in your own words what a *true biconditional statement* is.
- ERROR ANALYSIS** What is wrong with Jared's argument below?

~~The statements "I eat cereal only if it is morning" and "If I eat cereal, then it is morning" are not equivalent.~~

Skill Check ✓

Tell whether the statement is a biconditional.

- I will work after school only if I have the time.
- An angle is called a right angle if and only if it measures 90° .
- Two segments are congruent if and only if they have the same length.

Rewrite the biconditional statement as a conditional statement and its converse.

- The ceiling fan runs if and only if the light switch is on.
- You scored a touchdown if and only if the football crossed the goal line.
- The expression $3x + 4$ is equal to 10 if and only if x is 2.

WINDOWS Decide whether the statement about the window shown is true. Explain your answer using the definitions you have learned.

- The points D , E , and F are collinear.
- $m\angle CBA = 90^\circ$
- $\angle DBA$ and $\angle EBC$ are not complementary.
- $\overline{DE} \perp \overline{AC}$



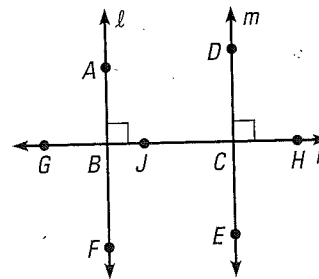
PRACTICE AND APPLICATIONS

STUDENT HELP

Extra Practice to help you master skills is on p. 805.

PERPENDICULAR LINES Use the diagram to determine whether the statement is *true* or *false*.

- Points A , F , and G are collinear.
- $\angle DCJ$ and $\angle DCH$ are supplementary.
- \overline{DC} is perpendicular to line l .
- \overline{FB} is perpendicular to line n .
- $\angle FBJ$ and $\angle JBA$ are complementary.
- Line m bisects $\angle JCH$.
- $\angle ABJ$ and $\angle DCH$ are supplementary.



STUDENT HELP

HOMEWORK HELP

- Example 1: Exs. 13–19
- Example 2: Exs. 20–23
- Example 3: Exs. 28–31
- Example 4: Exs. 32–37
- Example 5: Exs. 44–46

BICONDITIONAL STATEMENTS Rewrite the biconditional statement as a conditional statement and its converse.

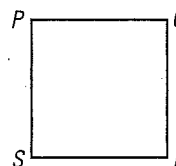
- 20. Two angles are congruent if and only if they have the same measure.
- 21. A ray bisects an angle if and only if it divides the angle into two congruent angles.
- 22. Two lines are perpendicular if and only if they intersect to form right angles.
- 23. A point is a midpoint of a segment if and only if it divides the segment into two congruent segments.

FINDING COUNTEREXAMPLES Give a counterexample that demonstrates that the converse of the statement is false.

- 24. If an angle measures 94° , then it is obtuse.
- 25. If two angles measure 42° and 48° , then they are complementary.
- 26. If Terry lives in Tampa, then she lives in Florida.
- 27. If a polygon is a square, then it has four sides.

ANALYZING BICONDITIONAL STATEMENTS Determine whether the biconditional statement about the diagram is true or false. If false, provide a counterexample.

- 28. \overline{SR} is perpendicular to \overline{QR} if and only if $\angle SRQ$ measures 90° .
- 29. PQ and PS are equal if and only if PQ and PS are both 8 centimeters.
- 30. $\angle PQR$ and $\angle QRS$ are supplementary if and only if $m\angle PQR = m\angle QRS = 90^\circ$.
- 31. $\angle PSR$ measures 90° if and only if $\angle PSR$ is a right angle.

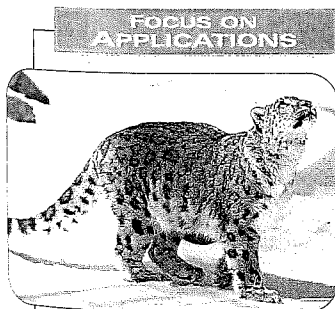


REWRITING STATEMENTS Rewrite the true statement in if-then form and write the converse. If the converse is true, combine it with the if-then statement to form a true biconditional statement. If the converse is false, provide a counterexample.

- 32. Adjacent angles share a common side.
- 33. Two circles have the same circumference if they have the same diameter.
- 34. The perimeter of a triangle is the sum of the lengths of its sides.
- 35. All leopards have spots.
- 36. Panthers live in the forest.
- 37. A leopard is a snow leopard if the leopard has pale gray fur.

237 USING ALGEBRA Determine whether the statement can be combined with its converse to form a true biconditional.

- 38. If $3u + 2 = u + 12$, then $u = 5$.
- 39. If $v = 1$, then $9v - 4v = 2v + 3v$.
- 40. If $w^2 - 10 = w + 2$, then $w = 4$.
- 41. If $x^3 - 27 = 0$, then $x = 3$.
- 42. If $y = -3$, then $y^2 = 9$.
- 43. If $z = 3$, then $7 + 18z^2 = 5z^2 + 7 + 13z^2$.



FOCUS ON APPLICATIONS

REAL LIFE SNOW LEOPARDS

The pale coat of the snow leopard, as mentioned in Ex. 37, allows the animal to blend in with the snow 3960 meters (13,000 feet) high in the mountains of Central Asia.