If-then statements show a cause and effect. The table shows some if-then statements.

A. Construct Arguments
Determine whether each effect is always true for the given cause, or is not necessarily true for the given cause. For the effects that are not necessarily true, how could you change them to make them always true?

Enter your answer.

Cause	Effect
If it is raining 	then it is spring.  5-6=-1
If x and y are whole numbers	then their difference $x - y$ is a ~~whole number~~. Integer
If water is heated to 212° F 	then it boils. 
If a triangle has a right angle	then it is a right triangle.
If your favorite color is blue 	then you are a good speller.

Conditional Statement

If → then form

A **conditional** is an *if-then* statement that relates a **hypothesis**, the part that follows *if*, to a **conclusion**, the part that follows *then*.

Conditionals can be represented as $p \rightarrow q$, read as "If p, then q," where p represents the hypothesis and q represents the conclusion.

$p \rightarrow q$

You can register to vote if you are at least 18 years old.

Identify the hypothesis: If you are at least 18 yr old

Identify the conclusion: then you can register to vote.

Write a conditional statement: If you are at least 18 yrs old, then you can register to vote.

A square must have 4 congruent sides.

Identify the hypothesis: A figure is a square

Identify the conclusion: 4 $\cong$ sides

Write a conditional statement: If a figure is a square, then it has 4 congruent sides.

Write each as a conditional statement: If-then form

A triagngle with all sides congruent is equilateral.

Alberto can go to the movies if he washes the car.

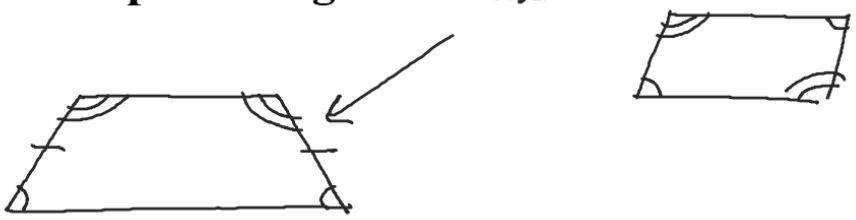
Determine if the conditional statement is true or false.
If false provide a <u>counterexample.</u>

If a number is divisible by 2 then it is an even number.

True

$\frac{7}{2} = 3.5$

If a quadrilateral has 2 pairs of congruent angles then the quadrilateral is a paralellogram. False



Determine if the conditional statement is true or false.
If false provide a counterexample.

If a quadrilateral has a right angle then it is a rectangle.

False

If *X* is the midpoint of segment AB then *X* lies on segment AB.

True

Related Conditional Statements

Definition	Symbols	Words
A conditional has a hypothesis and a conclusion.	$p \rightarrow q$	If p, then q.
The **converse** reverses the hypothesis and the conclusion of a conditional.	$q \rightarrow p$	If q, then p.
The **negation** of a statement has the opposite meaning of the original statement.	$\sim p$	not p
The **inverse** is obtained by negating both the hypothesis and the conclusion of a conditional.	$\sim p \rightarrow \sim q$	If not p, then not q.
The **contrapositive** is obtained by negating and reversing both the hypothesis and the conclusion of a conditional.	$\sim q \rightarrow \sim p$	If not q, then not p.

Determine if the conditional statement is true. If false provide a counterexample. Write the converse of the conditinal statement. Determine if the converse is true or false. If false provide a counterexample.

If you play the trumpet, then you play a brass insturment. true

If you play a brass insturment, then you play the trumpet

False

other brass insturments other than trumpet

Determine if the conditional statement is true. If false provide a counterexample. Write the converse of the conditinal statement. Determine if the converse is true or false. If false provide a counterexample.

If two angles are complementary, then their angle measures add up to 90.

If two angle measures add up to 90°, then the angles are complementary.