

## Speak Like A Mathematician:

conditional statement:

hypothesis:

conclusion:

negation:

biconditional statement:

### **Related Conditional Statements**

**Conditional:** If p, then q.       $p \rightarrow q$

**Converse:** \_\_\_\_\_       $q \rightarrow p$

**Inverse:** \_\_\_\_\_       $\sim p \rightarrow \sim q$

**Contrapositive:** \_\_\_\_\_       $\sim q \rightarrow \sim p$

**A conditional and its \_\_\_\_\_ are logically equivalent; so are the converse and \_\_\_\_\_.**

### **Example 1 - Hypothesis and Conclusion**

Identify the hypothesis and conclusion of each conditional.

- a) If today is July 4th, then today is a holiday.
- b) A number is divisible by 5 if it ends in 0.
- c) If an angle measures  $23^\circ$ , then it is acute.

### Example 2 - Negations

Write the negation of each statement.

- a) The lights are on.
- b) The book is not open.
- c) The triangle is equilateral.

### Example 3 - Converse, Inverse, Contrapositive

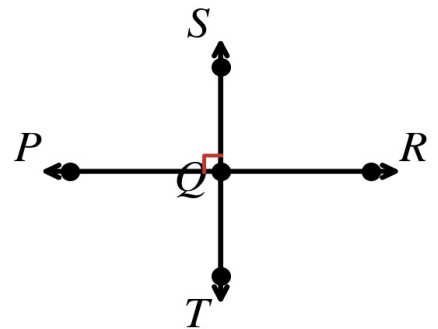
Write the converse, inverse, and contrapositive of each conditional.

- a) If  $x$  is even, then  $x + 1$  is odd.
- b) If it is January, then it is winter.

### Example 4 - True or False?

Decide whether each statement about the diagram is true. Explain.

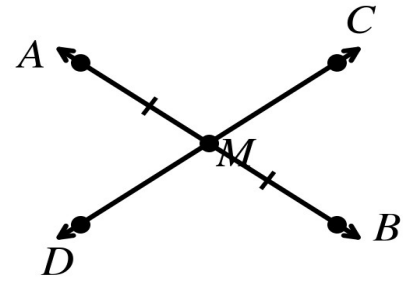
- a) Line  $QS \perp$  line  $PR$
- b)  $\angle PQS$  and  $\angle SQR$  are a linear pair.
- c) Ray  $QP$  and ray  $QS$  are opposite rays.
- d)  $\angle SQR$  is acute.



### Example 5 – True or False?

Decide whether each statement about the diagram is true. Explain.

- a)  $\angle AMC$  and  $\angle CMB$  are supplementary.
- b) M is the midpoint of segment AB.
- c)  $\angle AMC$  and  $\angle BMD$  are vertical angles.
- d) Line  $AB \perp$  line  $CD$ .



### Example 6 – Write a Conditional

Rewrite each statement in if-then form.

- a) All squares are rectangles.
- b) Use the Venn diagram.
- c) I wear boots whenever it snows.

### Example 7 – Biconditionals

Rewrite each definition as a single biconditional statement.

- a) If two angles are complementary, then their measures sum to  $90^\circ$ .
- b) If a point is a midpoint of a segment, then it divides the segment into two congruent segments.

