Logic Symbols
SOL 1b (2016)

Just like variables are used in algebra, logic also uses symbolic representations. Letters such as p and q are often used to represent entire statements. Other symbols include:

Negation	$\sim$	Ex.: $\sim p$ (Read as *not p*.)
Conjunction	$\wedge$	Ex.: $p \wedge q$ (Read as *p and q*.)
Disjunction	$\vee$	Ex.: $p \vee q$ (Read as *p or q*.)
If…then	$\rightarrow$	Ex.: $p \rightarrow q$ (Read as *if p then q*.)
If and only if	$\leftrightarrow$	Ex.: $p \leftrightarrow q$ (Read as *p if and only if q or q if and only if p*.)
Therefore	$\therefore$	Used to begin a conclusion (*i.e.* $\therefore q$)

Translate the following logic symbols into verbal statements using the following statements.

p: A parallelogram has four sides.

q: The sides are parallel.

r: The angles are right angles.

s: The quadrilateral is a square.

Example 1:

$$p \wedge q$$

Answer: A parallelogram has four sides, **and** the sides are parallel.

Example 2:

$$s \rightarrow q \wedge r$$

If a quadrilateral is a square then the sides are parallel and the angles are right angles.

Use the following statements to translate logic symbols into verbal statements.

p: The angles are congruent.

q: The angles are supplementary.

r: The lines are perpendicular.

s: The sum of the angles is 180°.

1. $p \wedge q$

2. $q \leftrightarrow s$

3. $r \rightarrow s$

4. $\sim p \vee q$

Translate the following statements into logic symbols.

    p: A quadrilateral is a parallelogram.

    q: The opposite angles are congruent.

    r: The sides are congruent.

    s: The quadrilateral is a rhombus.

Example 3:

If the opposite angles are congruent, then a quadrilateral is a parallelogram.

$q \rightarrow p$

Example 4:

The sides are congruent or the quadrilateral is not a rhombus.

$r \lor \sim s$

Translate the following statements into logic symbols

p:	The lines are parallel.
q:	The lines are perpendicular.
r:	The lines are coplanar.
s:	The lines intersect.

5.   If the lines are coplanar, then they will never intersect.

6.   Lines are parallel if and only if they are coplanar and never intersect.

7.   The lines intersect and they are not perpendicular.