

Conditionals

Conditional: A compound statement formed by using the words if.....then to combine two simple statements.

ex) If a number is a whole number, then it is an integer.

Symbol
→
 $p \rightarrow q$

Parts of a conditional

Hypothesis: An assertion that begins an argument, usually follows if.

Conclusion: An ending or a sentence that closes an argument, usually follows then.

p	q	$p \rightarrow q$
T	T	T
T	F	F
F	T	T
F	F	T

* The conditional is only False when the hypothesis is true and the conclusion is False."

Case 1: You get an A in Geometry.
I buy you a new graphing calculator.

Case 2: You get an A in Geometry.
I do not buy you a new graphing calculator.

Case 3: You do not get an A in Geometry.
I buy you a new graphing calculator.

Case 4: You do not get an A in Geometry.
I do not get you an new graphing calculator.

All girls love Math. \rightarrow If a person is a girl, then she likes math.

Hidden Conditionals: when the words "If...then" do not appear in a statement that does suggest a conditional. "When" or "in order that"

ex) When I finish my homework, I will go to the movies.

ex 1) For each sentence:

a. Identify the hypothesis p b. Identify the conclusion q.

1. If Mrs. Shusda teaches our class, then we will learn.

p q

2. The assignment will be completed if I work at it every day.

q p

3. The task is easy when we all work together and do our best.

q p

ex 2) Identify the truth value to be assigned to each conditional statement.

1. If $4 + 4 = 8$, then $2(4) = 8$

p q $T \rightarrow T = T$

2. If 2 is a prime number, then 2 is odd

p q $T \rightarrow F = F$

3. If 12 is a multiple of 9, then 12 is a multiple of 3.

f T $F \rightarrow T = T$

4. If $2 > 3$ then $2 - 3$ is a positive integer.

f f $F \rightarrow F = T$

ex 3) For each statement : a. Write the statement in symbolic form, b. Tell whether the statement is true or false.

Let m represent "Monday is the first day of the week" (True)

Let w represent "There are 52 weeks in a year." (True)

Let h represent "An hour has 75 minutes." (False)

1. If Monday is the first day of the week, then there are 52 weeks in a year.

$m \rightarrow w$
 $T \rightarrow T = T$

2. If there are 52 weeks in a year, then an hour has 75 minutes.

$w \rightarrow h$ $T \rightarrow F = F$

3. If there are not 52 weeks in a year then Monday is the first day of the week.

$\sim w \rightarrow m$
 $F \rightarrow T = T$

4. If Monday is the first day of the week ^{and} there are 52 weeks in a year, then an hour has 75 minutes.

$(m \wedge w) \rightarrow h$
 $T \rightarrow F = F$

$3 + 2 > 8$ if 2 is prime
q p
f T