Name:_____ Date:_____

# Practice

## 2-2 Manipulations of conditional statements

(1) Each statement below is followed by a second statement. Name the relation between statement 1 and the following statements as negation, converse, inverse, or contrapositive.

**Statement 1:** If you live in Atlantis, then you'll need a snorkel

a. **Statement 2:** if you do not live in Atlantis then you do not need a snorkel.

b. **Statement 3:** If you do not need a snorkel, then you do not live in Atlantis.

c. **Statement 4:** If you live in Atlantis, then you won't need a snorkel.

d. **Statement 5:** If you need a snorkel, then you live in Atlantas.

(2) Consider the true statement "If your temperature is more than $102°$ then you have a fever. If the original statement is represented by $p \rightarrow q$,

a. Write the statement that is represented by $q \rightarrow p$. What is it called?

b. Write the statement that is represented by $\sim p \rightarrow \sim q$. What is it called?

c. Write the statement that is represented by $\sim q \rightarrow \sim p$. What is it called?

(3) If you are a horse jokey, then you cannot be heavier than 100lbs.

a. Write the contrapositive. Is it true?

b. Write the inverse. Is it true?

c. Write the converse. Is it true?

d. Write the negation. Is it true?

(4) If the shape doesn't have straight sides, then it can't be a polygon.

a. Write the converse. Is it true?

b. Write the inverse. Is it true?

c. Write the negation. Is it true?

d. Write the contrapositive. Is it true?

(5) If a conditional statement is not true, then it's negation is true.

a. Write the converse. Is it true?

b. Write the negation. Is it true?

c. Write the inverse. Is it true?

d. Write the contrapositive. Is it true?

(6) If two lines never meet, then they are parallel

a. Write the converse of the statement above. Is it true?

b. Write a biconditional statement that contains both the original statement and the converse from above.

c. Is the biconditional statement you wrote a definition?

(7) Take the definition "It is an extraterrestrial iff it is a creature from somewhere other than Earth".

a. Write the two conditional statements that can be written from this definition.

b. Write the inverses of both the above statements.

c. Assuming this definition is true, is the following biconditional statement true? "It is not an extraterrestrial creature iff it is not a creature from somewhere other than Earth.

(8) Write a definition out of the following two statements:
If a car is a convertible, then it has a removable top.
If a car has a removable top, then it is a convertible.

(9) Determine if the following statements are good definitions for the italicized words. Write YES or NO and explain why.

a. If it is *New Year's Day*, then it is a holiday.

b. A *camera* is a device for taking pictures.

c. A *skunk* is an animal that has black and white fur.

d. *Ice* is frozen water.

e. *A ukulele* is a musical instrument that has 4 strings.

(10) Write a mathematically correct definition for each of the following.

a. Novel:

b. I-phone: