

## 2.2 Conditional Statements

### Homework Day 2

HW: p. 84-86 #14-15, 17-18, 19-21, 23, 35, 38-40, 50-52

p. 99 #16, 18, 20, 22

Identify the **hypothesis** and **conclusion** of each conditional statement.

#14 “**Four angles are formed** if **two lines intersect**.”

#15 “If **8 ounces of cereal costs \$2.99**, then **16 ounces of cereal costs \$5.98**.”

Write a conditional statement from each sentence.

#17 After three strikes, the batter is out.

If a batter gets three strikes, then he is out.

#18 Congruent segments have equal measures.

If segments are congruent, then they have equal measures.

Determine if each conditional is true. If false, give a counter example.

#19 If you subtract  $-2$  from  $-6$ , then the result is  $-4$ .

**True:**  $-6 - (-2) = -4$

#20 If two planes intersect, then they intersect in exactly one point.

**False:** 2 planes intersect at exactly one **line**.

#21 If a cat is a bird, then today is Friday.

**\*True\*:** Since the hypothesis is not true, you will not be able to find a counterexample to prove that this statement is false.

#23 Write the converse, inverse, and contrapositive of each conditional statement. Find the truth value of each.

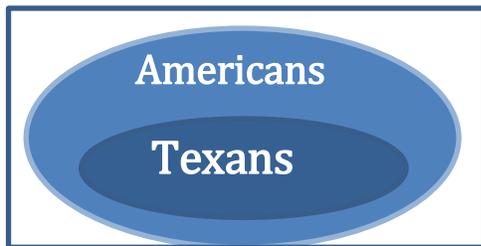
Meteorology: If freezing rain is falling, then the air temperature is  $32^{\circ}\text{F}$  or less.  
 (Hint: The freezing point of water is  $32^{\circ}\text{F}$ )

**Converse:** If the air temperature is  $32^{\circ}\text{F}$  or less, then freezing rain is falling.

**Inverse:** If freezing rain is **NOT** falling, then the air temperature is **NOT**  $32^{\circ}\text{F}$  or less.

**Contrapositive:** If the air temperature is **NOT**  $32^{\circ}\text{F}$  or less, then freezing rain is **NOT** falling

#35 Write a conditional statement from each Venn Diagram.



If people are Texans, then they are Americans.

Find a counterexample to show that the converse of each conditional is false.

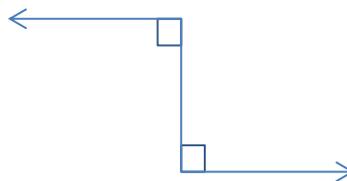
#38 "If  $x = -5$ , then  $x^2 = 25$ ." **Converse:** If  $x^2 = 25$ , then  $x = -5$ .

False  $\rightarrow$   $x$  could equal a positive 5.

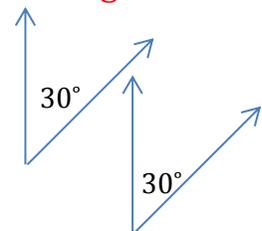
#39 "If two angles are vertical angles, then they are congruent."

**Converse:** If two angles are congruent, then they are vertical angles.

False  $\rightarrow$  Examples:



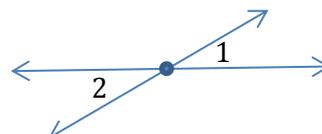
Or



#40 "If two angles are adjacent, then they share a vertex."

**Converse:** If two angles share a vertex, then they are adjacent.

False  $\rightarrow$  Example:



#50 What is the inverse of “If it is Saturday, then it is the weekend?”

- A) If it is the weekend, then it is Saturday.
- B) If it is not Saturday, then it is the weekend.
- C) If it is not Saturday, then it is not the weekend.
- D) If it is not the weekend, then it is not Saturday.

#51 Let a represent “Two lines are parallel to the same line,” and let b represent “The two lines are parallel.” Which symbolic statement represents the conditional “If two lines are NOT parallel, then they are parallel to the same line.”

- F)  $a \rightarrow b$       G)  $b \rightarrow a$       H)  $\sim b \rightarrow a$       J)  $b \rightarrow \sim a$

#52 Which statement is a counterexample for the conditional statement

“If  $f(x) = \sqrt{25 - x^2}$ , then  $f(x)$  is positive?”

- A)  $x = 0$       B)  $x = 3$       C)  $x = 4$       D)  $x = 5$

p. 99 #16, 18, 20, 22

**#16 Determine if the biconditional is true. If false, give a counterexample.**

Felipe is a swimmer if and only if he is an athlete.

The conditional is true: If Felipe is a swimmer, then he is an athlete.

The converse is false: If Felipe is an athlete, then he is a swimmer. Felipe could be an athlete but not be a swimmer.

**#18 Write each definition as a biconditional.**

A circle is the set of all points in a plane that are fixed distance from a given point.

A figure is a circle if and only if it is the set of all points in a plane that are a fixed distance from a given point.

Determine if a true biconditional can be written from each conditional statement. If not, give a counterexample.

#20 If  $a = b$ , then  $|a| = |b|$ .

Not biconditional. Counterexample:  $a = -1, b = 1$ .

#22 If  $y^2 = 64$ , then  $3y = 24$ .

Not biconditional. Counterexample:  $y = -8$ .