Name _____ Period _____ 9/27/10 – 10/1/10 GL

# LOGIC

------------------------------------------------------------

**1) I can define, identify and illustrate the following terms**

| Conditional | Conclusion | Contrapositive | Negation |
| statement | Inverse | Biconditional | Counterexample |
| Hypothesis | Converse | Truth Value | Conjecture |

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**Monday, 9/27/10**

| (2-2) Conditional Statements | Check Point |
|---|---|
| How are the different forms of a conditional statement the same? How are they different? | Grade: |
| 2) I can determine the hypothesis and conclusion of a conditional statement. | |
| 3) I can determine the truth value of a conditional statement. | |
| 4) I can give prove a conditional statement false by giving a counterexample. | |
| 5) I can draw valid conclusions given multiple representations. | |
| 6) I know what I can assume from a picture in geometry. | |
| **ASSIGNMENT:** Introduction Worksheet | Grade: |

**Tuesday, 9/28/10**

| (2-2) Conditional Statements | Check Point |
|---|---|
| How are the different forms of a conditional statement the same? How are they different? | Grade: |
| 7) I can write the inverse, converse, and contrapositive of a conditional statement. | |
| 8) I can write a conditional statement from a sentence. | |
| **ASSIGNMENT:** Conditional Statement Worksheet | Grade: |

**Wednesday and Thursday, 9/29-30/10**

| (2-4) Biconditional Statements | Check Point |
|---|---|
| How are a biconditional statement and a definition related? | Grade: |
| 9) I can write a biconditional statement. | |
| 10) I can write a biconditional statement as 2 conditional statements. | |
| 11) I can convert to and from definitions and biconditional statements. | |
| **ASSIGNMENT:** p 99 (1-5,8-9,10-15,18-19) 15 problems and Review | Grade: |

**FRIDAY, 10/1/10**

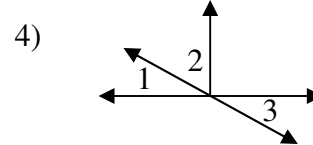| Test Part A: Vocabulary and Conditional Statements | |
|---|---|
| **ASSIGNMENT:** Test Part A | **Test Part A Grade:** |

**NOTES: Fill in the notes**

I. What can you assume from pictures in Geometry class:

1. _____ points

2. _____ of points

3. _____ points

4. _____ angles and lines

5. _____ angles

6. _____ of angles

7. _____ angles

## Practice: Answer here

For each picture list the facts you ***can*** assume from it.

1)



2)



3)



4)
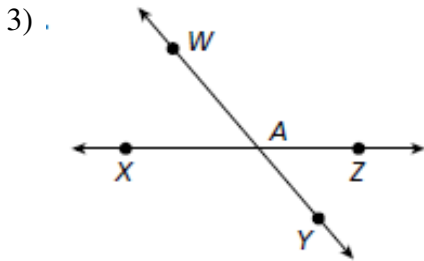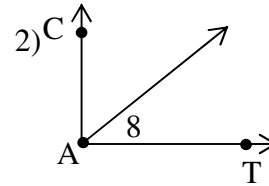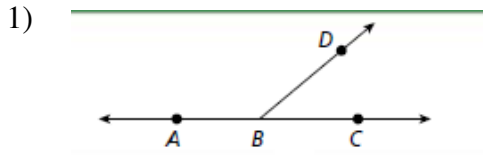


**NOTES: Fill in the notes**

II. Conditionals

- A conditional is a _____ written in _____ format.

- The _____ is the part of the conditional that follows the word

  _____.

- The _____ is the part of the conditional that follows the word

  _____.

- The conclusion _____ on the hypothesis

## Practice: Answer here

Underling the hypothesis and circle the conclusion

1) If you live in Houston, then you live in Texas.

2) If an angle is obtuse, then it has a measure of 100°

## NOTES: Fill in the notes

III. Determine Truth Value

- The _____ is true

- You are deciding if the _____ is _____ true.

    o If _____, then the truth value is _____

    o If _____, then the truth value is _____

- If it is false, then you must give a _____.

    o This is an example of when the _____ is false.

## Practice: Answer here

1. If you live in Paris, then you live in France

    Truth Value: _____        Counterexample:_____

2. If an animal is a bird, then it can fly.

    Truth Value: _____        Counterexample:_____

## NOTES: Fill in the notes

IV. Drawing Conclusions

- From Data

    o _____ carefully

    o Make sure it fits the _____

- From Conditionals

    o The _____ of the second statement must be the _____ of the first statement.

- From other statements

       o  Be _____

       o  Meet all the _____.

## Practice: Answer here

2003 Exit

**55)** The graph shows the price of a share of Compuco stock at the close of each day during a 1-week period.

Based on the data in the graph, which conclusion is most accurate?

**A**   The closing price remained constant throughout the week.
**B**   The closing price increased at the beginning of the week and then leveled off at the end of the week.
**C**   The closing price decreased at the beginning of the week and then increased at the end of the week.
**D**   The closing price each day was lower than the closing price on the previous day.
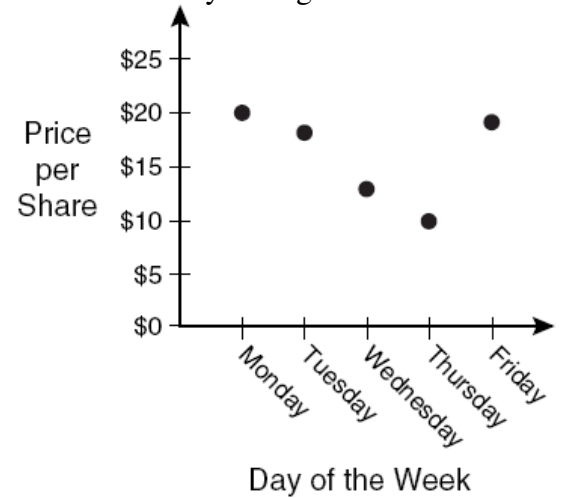
**What would be a valid conclusion:**
1.  If today is Friday, than Mrs. Ross wears jeans. If Mrs. Ross wears jeans, than she wears tennis shoes.

2.  All snakes are reptiles. Jim is a snake

3.  All bears have four legs. Winnie has four legs.

# Introduction to Logic: Making Assumptions and Conditionals Worksheet

I. Based on the picture alone, determine if each statement is true or false.

1. $\overleftrightarrow{ET} \parallel \overleftrightarrow{SR}$

2. $\measuredangle MES$ is a right angle.

3. $T$ is between $E$ and $H$.

4. $M$, $O$, $S$, and $H$ are coplanar.

5. $\overline{MO} \cong \overline{OE}$

6. $\measuredangle OET \cong \measuredangle TES$

7. $m\measuredangle OET + m\measuredangle TES = m\measuredangle OES$

8. $\overleftrightarrow{EH}$ is a straight line
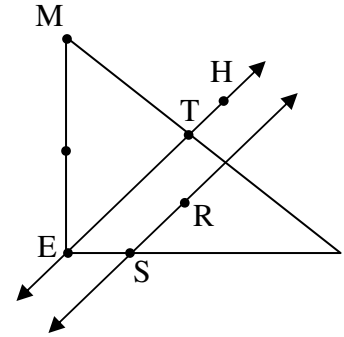
II. Based on the picture alone, determine if each statement is true or false.

9. $\overline{AE} \parallel \overline{BC}$

10. $\overline{AB} \perp \overline{BC}$

11. $m\measuredangle ECB = 90°$

12. $\measuredangle AEB$ and $\measuredangle BEC$ are complementary.

13. $C$ is the midpoint of $\overline{BD}$.

14. $\measuredangle BCE$ and $\measuredangle ECD$ are a linear pair.

15. $\measuredangle ABE$ and $\measuredangle EBC$ are complementary.
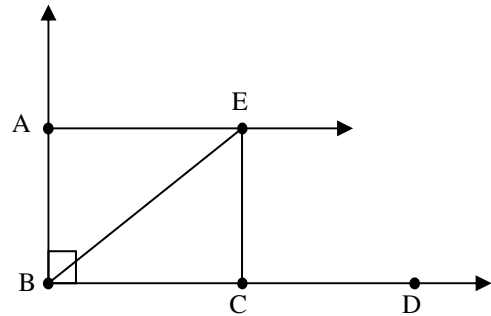
III. Determine the truth value for each statement. Provide a counterexample if it is false.

16. If an object is a ring, then it is made of gold.

17. If an insect is a spider, then it has eight legs.

18. If a shape has 4 sides, then it is a square.

IV. Drawing Conclusions

19. If Jimmy buys a Homecoming Dance ticket, then he will ask Elizabeth to the dance.
    If Jimmy asks Elizabeth to the dance, then she will buy a dress.

20. If Bobby Joe works on Saturday, then he will earn $200. If Bobby Joe has $100, he
    will buy an iPod.

21. All babies like red. Maggie is a baby.

**22)** A physical education class had 20 students. The table below shows the students' grades and the number
of days each student was absent.

Which conclusion about the students in this class is true?

### Grade Compared with Attendance

| Grade | Number of Days Absent |
|---|---|
| A | 0, 3, 2, 2, 1, 1, 4 |
| Less than A | 4, 5, 9, 7, 6, 3, 5, 3, 6, 5, 8, 7, 9 |

**A**  Each student who earned a grade of A was absent fewer than 4 days.
**B**  Each student who was absent fewer than 4 days earned a grade of A.
**C**  Each student who was absent more than 2 days did not earn a grade of A.
**D**  Each student who did not earn a grade of A was absent more than 2 days.

| TERM: | DEFINITION: |
|---|---|
| **Conditional Statement** | A statement written in "if-then" format |
| ***Hypothesis*** | The phrase following but NOT INCLUDING the word if. |
| ***Conclusion*** | The phrase following but NOT INCLUDING the word then. |

Ex 1: Underline the hypothesis and circle the conclusion of the conditional statement below.

*If you have an 85% or higher, then you do not need to retest.*

Ex 2: Rewrite the statement below as a conditional statement, underline the hypothesis and circle the conclusion of the conditional statement below.

*A car with poor brakes is a menace on the highway.*

Conditional:

Ex 3: Rewrite the statement below as a conditional statement, underline the hypothesis and circle the conclusion of the conditional statement below.

*Geometry teachers give their students homework on days that end in 'y'.*

Conditional:

| TERM: | DEFINITION: |
|---|---|
| ***Negation*** | The denial of a statement (add not) |
| **Inverse** | Formed by negating both the hypothesis and conclusion of a conditional statement<br>(add not) |

Ex 6: Write the inverse of the conditional statement below.

*If you pass the TAKS test, then you will graduate.*

Inverse:

Ex 7: Write the inverse of the following statement.

*If school is in session, then it is a weekday.*

Inverse:

| TERM: | DEFINITION: |
|---|---|
| **Converse** | Formed by switching the hypothesis and conclusion of a conditional |

Ex 4:  State the converse of the conditional statement.

*If it is Saturday, then you do not have school.*

Converse:

Ex 5:  Write the converse of the conditional statement below.

*If an angle has a measure of 120°, then it is an obtuse angle.*

Converse:

| TERM: | DEFINITION: |
|---|---|
| **Contrapositive** | Formed by negating the hypothesis and conclusion of the converse.<br>(switch and add not) |

Ex 8:  *Write both the converse and the contrapositive of*
the conditional statement below.

*If you run a red light, then you are breaking a traffic law.*

Contrapositive:

Ex 9:   Write the contrapositive of the conditional statement below.

*If you leave the classroom, then you must take a pass with you.*

Contrapositive:

| TERM: | DEFINITION: |
|---|---|
| **Counterexample** | An example that follows the hypothesis, but not the conclusion. |

Ex 10:  Give a counterexample for the statement.

*If you leave the classroom, then you must take a pass with you.*

Counterexample:

NAME_____DATE_____
_____PER._____

## Homework:  CONDITIONAL STATEMENTS

**Underline the hypothesis and circle the conclusion of the conditional statement below. Determine whether the conditional statement is true or false and circle your answer.**

1.  If a man is 7 feet tall, then he plays basketball.          T     or     F

2.  If you are in a jet above the clouds, then you are flying.          T     or     F

3.  If you are in Alaska, then it is 32°          T     or     F


**Write the inverse of each conditional statement below.**

4.  If an object is a battery, then it is rechargeable.

    *Inverse:*

5.  If an object is a computer, then it has a hard drive.

    *Inverse:*

6.  If an animal is black and white, then it is a penguin.

    *Inverse:*


**Write the converse of each conditional statement below.**

7.  If an object is a ring, then it is made of gold.

    *Converse:*

8.  If an object is a bird, then it can fly.

    *Converse:*

9.  If your grade is a 96, then you are making an A.

    *Converse:*

10. If you play football, then you wear a uniform.

    *Converse:*

**Write the contrapositive of each conditional statement below.**

11. If a species walks on two feet, then it is human.

*Contrapostitive:*

12. If a gem is a ruby, then it is red.

*Contrapostitive:*


13. If a species is a fish, then it lives in water.

*Contrapostitive:*


# *Write a conditional statement for the situation described, and then write its converse, inverse, and contrapositive.*

## *Sophomores must have at least 5 credits.*

14. Conditional:

15. Inverse:

16. Converse:

17. Contrapositive:

# *Determine the conditional statement for the situation described, and then determine its converse, inverse, and contrapositive.*

*It is raining outside so it's cloudy.*

18._____ Conditional:

    a. If it is cloudy outside, then it is raining.
    b. Then it is cloudy outside, if it is cloudy.
    c. If it is raining outside, then it is cloudy.

19. _____ Inverse:

    a. If it is not raining outside, then it is not cloudy.
    b. If it is cloudy, then it is not raining.
    c. If it is not cloudy, then it is not raining.

20._____ Converse:

    a. If it is cloudy, then it is raining outside.
    b. If it is not raining outside, then it is cloudy.
    c. If it is cloudy, then it is not raining outside.

21._____ Contrapositive:

    a. If it is not raining, then it is not raining.
    b. If it is not cloudy, then it is not raining.
    c. If it is not raining, then it is not cloudy.

**Give a counter example to the conditional statement in 18.**

22. Counterexample:

# Biconditional Statements

I. When you combine a _____ statement and its _____,

you create a _____statement.  These statements are **true** when read

forwards and backwards.  Biconditional statements must be written with the phrase "

_____," or "_____."

Example:

    Conditional:  If a solution has a pH less than 7, then it is an acid.

    Converse:  If a solution is an acid, than its pH is less than 7.

    Biconditional:  A solution is an acid if and only if it has a pH less than 7.

Your Turn:

1) Conditional: If a point is a midpoint, then it divides a segment into two congruent

    segments.

Converse: _____

    _____

    _____

Biconditional: _____

    _____ if and only if _____

    _____

2) Conditional: If points lie on the same line, then they are collinear.

Converse: _____

    _____

    _____

Biconditional: _____

    _____ if and only if _____

    _____

II. Good definitions are also true when read forwards and backwards.  Therefore, we also write _____ as biconditional statements.

Example:

Defintion: A triangle is a three-sided polygon.

Biconditional:  A figure is a triangle if and only if it is a three-sided polygon.

Your Turn:

1) Definition:  The measure of a straight angle is 180°.

Biconditional: _____

_____

_____

2) Definition:  An angle is a figure formed by two rays with a common endpoint.

Biconditional: _____

_____

_____

3) Definition:  An angle is obtuse when it measures between 90° and 180°.

Biconditional: _____

_____

_____

III.  Now, write the conditional statement and the converse from the following biconditional statement.

Biconditional: Two angles are congruent if and only if their measures are equal.

Conditional:_____

_____

Converse: _____

_____

Multiple Choice:

1.  Which of the following biconditionals is equivalent to the definition:

"An endpoint is a point at the end of a segment or at the start of a ray."

a.  A point is an endpoint if and only if it is the start of a ray.

b.  A point is an endpoint if and only if it lies on a segment or a ray.

c.  A point is an endpoint if an only if it is a point.

d.  A point is an endpoint if and only if it is at the end of a segment or the start of a ray.

2. Which biconditional is equivalent to the spelling phrase:

"*I* before *E* except after *C*"?

a. The letter *I* comes before *E* if and only if *I* follows *C*.

b. The letter *E* comes before *I* if and only if *E* follows *C*.

c. The letter *E* comes before *I* if and only if *E* comes before *C*.

d. The letter *I* comes before *E* if and only if *I* comes before *C*.

3. Which of the following could be a conditional statement for the following biconditional?

"You can get your license if and only if you passed the drivers test."

a. If you take the drivers test, then you will get your license.

b. If you passed the drivers test, then you can get your license.

c. If you can get your license, then you passed the drivers test.

d. All of the above could be conditional statements.

HW: p 99 (1-5,8-9,10-15,18-19) 15 problems

**Use the conditional statement below to answer questions 1 – 5.**
*If today is Sally's birthday, then she will eat cake.*

| | |
|---|---|
| 1.  Identify the hypothesis: | |
| 2.  Identify the conclusion: | |
| 3.  Write the inverse: | |
| 4.  Write the converse: | |
| 5. Write the contrapositive: | |

**Use the conditional statement below to answer questions 6 - 10.**
*If an animal is a dog, then it has a wet nose..*

| | |
|---|---|
| 1.  Identify the hypothesis: | |
| 2.  Identify the conclusion: | |
| 3.  Write the inverse: | |
| 4.  Write the converse: | |
| 5.  Write the contrapositive: | |

**Underline** the hypothesis and circle the conclusion of the conditional statement below. Determine whether the conditional statement is true or false and circle your answer. If salse give a counterexample.

21. If the date is December 25, then it is Christmas.     T     or     F

22. If an animal is  swimming, then it is a fish.     T     or     F

6. What is the converse of "If you saw the movie, then you know how it ends"?
   A  If you know how the movie ends, then you saw the movie.
   B  If you did not see the movie, then you do not know how it ends.
   C  If you do not know how the movie ends, then you did not see the movie.
   D  If you do not know how the movie ends, then you saw the movie.

7. What is the inverse of "If you received a text message, then you have a cell phone"?
   F  If you have a cell phone, then you received a text message.
   G  If you do not have a cell phone, then you did not receive a text message.
   H  If you did not receive a text message, then you do not have a cell phone.
   J  If you received a text message, then you do not have a cell phone.

The table shows the lengths of five green iguanas after birth and then after 1 year.

1. Estimate the length of a green iguana after 1 year if it was 8 inches long when it hatched.

2. Make a conjecture about the average growth of a green iguana during the first year.

| Iguana | Length after Hatching (in.) | Length after 1 Year (in.) |
|---|---|---|
| 1 | 10 | 36 |
| 2 | 9 | 34 |
| 3 | 11 | 35 |
| 4 | 12 | 35 |
| 5 | 10 | 37 |

8.   What can you conclude from the following picture?

A

B