

Name \_\_\_\_\_ Per. \_\_\_\_\_ Date \_\_\_\_\_

Honors Geometry Practice Test 2.1-2.4

For problems 1-2, determine the truth-value of the following conditionals. If false, provide a counterexample.

1. If  $\angle ABC + \angle CBD = 90$  then  $\angle ABD$  is a right angle.

2. If  $\overline{XY}$  and  $\overline{ZW}$  intersect at  $A$  then  $A$  is between  $X$  and  $Y$ .

3. The following statement is the **INVERSE** of a given conditional. Write the converse **AND** determine the truth-value of the converse.

If there are two congruent segments then they are formed by a segment bisector.

4. In *Alice in Wonderland*, Alice enters a strange forest. In this forest Alice found a Lion and a Unicorn. These two are strange creatures. The lion always lies on Mondays, Tuesdays, and Wednesdays, and he tells the truth on the other days of the week. The Unicorn, on the other hand, always lies on Thursdays, Fridays, and Saturdays and tells the truth on the other days of the week. Alice asked each of them what day of the week it was. This was their responses:

Lion: Yesterday was one of my lying days.

Unicorn: Yesterday was one of my lying days too.

Based on their responses, what day of the week is it? **EXPLAIN YOUR REASONING!**

5. Adventurer Silas Seeker landed on a strange and mysterious island. On this island there were three tribes of trolls. One that always tells the truth (called the TRUTHFULS), one that always lies (called the LIARS), and the third which always alternated between telling the truth and telling a lie. In other words, if the first statement is a lie then the next statement must be the truth or vice versa. (They are called ALTERNATORS). Upon arriving, Silas had his belongings stolen. The tribe leader from the TRUTHFULS informed Silas that he saw 4 trolls (all of them ALTERNATORS) near Silas's possessions. He is sure that one of them is the thief, but to which one exactly he cannot say. Silas interrogated the 4 trolls to identify the thief.

Amos: I am not the thief.  
Davis is the thief.

Barney: I am not the thief.  
Amos is lying when he says Davis is the thief.

Charley: I am not the thief.  
Either Amos is the thief or none of us is.

Davis: I am not the thief.  
If Charley is not the thief then Amos is.

Which troll is the thief? **JUSTIFY** your answer!

6. Use the **Law of Syllogism** to reach a logical conclusion based on the following statements:

1. Those that cannot wiggle their ears were born in the age of reason.
2. People whose zodiac sign is Gemini have the ability to storm a castle.
3. Those that do not play hockey are not long tailed moose.
4. Anyone that can wiggle their ears has Gemini as a Zodiac sign.
5. Those that play hockey were not born in the age of reason.

7. Under what truth-value conditions for  $p$ ,  $q$ , and  $r$  will the following statement be **TRUE**:

$$\left[ (\sim r \wedge \sim q) \vee (\sim p \vee r) \right] \wedge (q \vee p)$$

8. Create a Venn Diagram that would represent this data.

200 people were asked which of these grand slam tournaments that they have attended. The tournaments inquired about were: US Open, Wimbledon, or Australian Open.

- 30 people have not attended any of these tournaments.
- 10 people have been to all three tournaments.
- 25 people have been to Wimbledon and the Australian Open.
- 20 people have been to the US Open and the Australian Open but not to Wimbledon.
- 65 people have been to exactly two of the tournaments.
- 165 people have been to the US Open or to Wimbledon.
- 120 people have been to Wimbledon or to the Australian Open.