Geometry Seminar I Pledge\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ Problem Set 1: Set Theory

This assignment is due at the beginning of class on August 31. Justify answers. Copying work and/or answers is a violation of the honor code.

1. Given: A=  B = 

C =  D = 

On the basis of your knowledge of number facts, tell for which of the given sets the

statement listed would not be reasonable postulate.

1. The sum of any two members is a member of the set.
2. The difference of any two members is a member of the set.
3. For any two members a and b, .
4. For any member there is a member b of the set such that .
5. Now that you have had time to go through the logic caching, see if you can complete the following multiple choice problems:

**1.** Given the true statements: “Rob plays basketball or tennis.”

“Rob does not play tennis.”

Which statement must also be true?

(1) Rob plays basketball.

(2) Rob does not play basketball.

(3) Rob does not play basketball, and he does not play tennis.

(4) Rob plays football.

**2.** Which statement is *false*?

(1) All parallelograms are quadrilaterals.

(2) All rectangles are parallelograms.

(3) All squares are rhombuses.

(4) All rectangles are squares.

**3.** Under which operation is the set of odd integers closed?

(1) addition (3) multiplication

(2) subtraction (4) division

**4.** Which statement is logically equivalent to “If I am in a mathematics

class, then I am having fun”?

(1) If I am not in a mathematics class, then I am not having fun.

(2) If I am having fun, then I am in a mathematics class.

(3) If I am not having fun, then I am not in a mathematics class.

(4) If I am in a mathematics class, then I am not having fun.

**5.** What is the converse of the statement “If , then Δ*ABC* is a

right triangle”?

1. If Δ*ABC* is a right triangle, then .
2. if, and only if, Δ*ABC* is a right triangle.

(3) If Δ*ABC* is not a right triangle, then .

(4) If, then Δ*ABC* is not a right triangle.

**6.** The statement “Maya plays on the basketball team or Maya joins the

ski club” is *false.* Which statement is true?

(1) Maya plays on the basketball team and Maya joins the ski club.

(2) Maya plays on the basketball team and Maya does not join the ski

club.

(3) Maya does not play on the basketball team and Maya joins the ski

club.

(4) Maya does not play on the basketball team and Maya does not join

the ski club.

1. Construct a truth table to prove that each of the following conditionals is a true statement.
2.  B. 
3. Complete the following truth table to support the following statement,

“The contrapositive of a conditional is equivalent to the conditional”

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| p | q |  |  |  |  |  |
|  |  |  |  |  |  |  |
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