Advanced Geometry – Concepts and Questions
Chapter 2 – Reasoning and Proof

2-1 Inductive Reasoning and Conjecture
1. What is inductive reasoning?
2. What is a conjecture?
3. What is a counterexample?
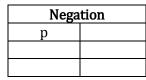4. How many counterexamples are needed to prove a conjecture is false?

   Check: Pg. 94: #2, 5, 8, 13

2-1 Assignment: Pg. 95: #15-27 (mult. of 3), 28-34 all, 37-38, 41-47 odd, 51, 55, 57, 62, 68

2-2 Logic
1. What is meant by the truth value of a statement?
2. What is the negation of a statement? Use symbols to write "the negation of p."
3. What is a conjunction? Use symbols to write "p and r."
4. What is a disjunction? Use symbols to write "p or r."
5. Complete the truth tables.

Negation	
p	

Conjunction		
p	q	

Disjunction		
p	q	

6. Draw an example of a Venn diagram.

   Check: Pg. 103: #2, 4, 10

2-2 Assignment: Pg, 103: #11-21 odd, 24, 27, 29, 31-33, 41, 44-46, 50, 53, 57

2-3 Conditional Statements
1. What form do conditional statements take? Give an original, specific example.
2. What is the notation used for conditional statements?
3. What is the hypothesis of a conditional statement?
4. What is the conclusion of a conditional statement?
5. Complete the truth table for a conditional statement.
6. There are three other statements related to a conditional statement.
   Name them and use symbols to represent each one.
7. What is meant by "logically equivalent" statements?

   Check: Pg. 111: #3, 6, 10, 13

Conditional		
p	q	

2-3 Assignment: Pg. 111: #18-30 (multiples of 3), 35-51 odd, 53-56 all, 59-60, 63, 67, 69, 70, 79

2-4 Deductive Reasoning
1. How is deductive reasoning different from inductive reasoning?
2. What does the Law of Detachment say?
3. Give a specific original example of the Law of Detachment.
4. What does the Law of Syllogism say?
5. Give a specific original example of the Law of Syllogism.

    Check: Pg. 121: #1, 2, 5, 8

2-4 Assignment: Pg. 121 #9-21 odd, 22, 23-25 all, 29-39 odd, 42, 45, 47, 50, 54, 59-63 odd

2-5 Postulates and Paragraph Proofs
1. What is a postulate?
2. Familiarize yourself with the seven postulates about points, lines, and planes. Are any unclear to you?
3. What is a proof?
4. What is a theorem?
5. Is a paragraph proof formal or informal?
6. State **Theorem 2.1 The Midpoint Theorem**. Include a sketch.
    Check: Pg. 130: #2, 7, 9, 10, 12

2-5 Assignment: Pg. 131: #24-33 all, 35-41 odd, 42, 45, 48, 49, 53, 54, 56, 57, 60
2-6 Algebraic Proof
1. List the (nine) properties of real numbers and give an example of each.
2. What is a two-column or formal proof?

    Check: Pg. 139 #1, 4, 5

2-6 Assignment: Pg. 139 #9-15 odd, 17, 18, 23, 25, 30, 31, 34, 38, 39, 42, 44, 46-48

2-7 Proving Segment Relationships
1. State the **Segment Addition Postulate** and give an example.
2. State **Theorem 2.2 Properties of Segment Congruence**.

    Check: Pg. 147 #1

2-7 Assignment: Pg. 147 #4, 8, 9, 12, 14, 17, 19, 20, 25, 26, 34

2-8 Proving Angle Relationships
1. State the **Angle Addition Postulate** and give an example
2. State **Theorem 2.3 Supplement Theorem**.
3. State **Theorem 2.4 Complement Theorem**.
4. State **Theorem 2.5 Properties of Angle Congruence**.
5. State **Theorem 2.6 Congruent Supplements Theorem**.
6. State **Theorem 2.7 Congruent Complements Theorem**.
7. State **Theorem 2.8 Vertical Angles Theorem**.
8. State the (five) **Right Angle Theorems (2-9, 2-10, 2-11, 2-12, 2-13)**.

    Check: Pg. 156 #2, 4, 6

2-8 Assignment: Pg. 156 #8-12 even, 14, 15, 21, 23, 27, 32, 34, 37-39, 45-53 odd