Name_____________________________________

Honors Geometry **Ch 2 Notes Packet**

Section 2-1:

After this section you will be improving your skills in the following Mathematical Practice(s):

2. Reason abstractly and quantitatively

7. Look for and make use of structure

Specifically, you should be able to:

- **Make conjectures based on inductive reasoning**
- **Find counterexamples**

Inductive Reasoning:

Conjecture:

Counterexample:

Examples:

Section 2-2:

After this section you will be improving your skills in the following Mathematical Practice(s):

2. Reason abstractly and quantitatively

7. Look for and make use of structure

Specifically, you should be able to:

- **Determine the truth values of negations, conjunctions and disjunctions**
- **Represent conjunctions and disjunctions with Venn diagrams**

Statement:
Truth Value:
Negation:
Compound Statement:

An "and" statement in logic is called a _________________.
An "and" statement is only true if _____________________.

An "or" statement is called a _________________.
An "or" statement is true if _______________________.

Two statements are ________________if they have the exact same
________________.

Truth Tables:

p	q	~p	~q				
T	T						
T	F						
F	T						
F	F						

_____________________(ds): If one part of a true "or" statement is _______,
then the other part must be ________.
given: p or q , ~q
conclusion:

Examples:

Section 2-3:

After this section you will be improving your skills in the following Mathematical Practice(s):

7. Look for and make use of structure

Specifically, you should be able to:

- **Analyze statements in if-then form**
- **Write the converse, inverse and contrapositive of if-then statements**

A ____________________statement is a statement in __________ form.

The "if" part is the ______________.
The "then" part is the _______________.

Ex: If you live in Frankenmuth, then you live in Michigan.

The ____________________of a statement is formed by _______________ the hypothesis and conclusion. (backwards)

Ex:

The ____________________of statement is the ________________of the statement. (negative)

Ex:

The ____________________of a statement is the ________________________, (backwards and negative of the ____________________).

Ex:

The contrapositive of a _______________ statement is always ____________, so we call them _________________________statements.

An if-then statement is only false if the hypothesis is ____________ and the conclusion is _____________.

p	q	~p	~q				
T	T						
T	F						
F	T						
F	F						

Notice again that p → q is logically equivalent to ~q → ~p, because they have the same truth tables.

A _______________________statement is a statement that contains the phrase ________________.

Saying “I am working if and only if it is Saturday,” means….

AND

A good _______________can be written as a biconditional statement.

ex: Two angles are ___________________if and only if they share a________________________ , but no ______________________.

ex:

A biconditional statement is only true if its ____________________________.

Examples:

<u>Section 2-4:</u>

After this section you will be improving your skills in the following Mathematical Practice(s):

2. Reason abstractly and quantitatively

3. Make logical arguments and critique the reasoning of others

Specifically, you should be able to:

- **Use the Law of Detachment/ Syllogism/ Disjunctive Syllogism**
- **Use the fact that the contrapositive of a true statement is true**

________________________ is drawing logically _____________conclusions by using an argument involving facts, rules, definitions or properties. This is the type of reasoning we use in _________________.

<u>Law of Detachment:</u>

Given: If p then q, p

Conclusion:

<u>Law of Syllogism:</u>

Given: If A then B, If B then C.

Conclusion:

Examples

Law of Detachment (L.O.D.)

Premises: If Liam forgets his lunch, then he will be hungry. Liam forgot his lunch.

Conclusion:

Law of Syllogism (L.O.S)

Premises: If Liam forgets his lunch, then he will be hungry. If Liam is hungry, then he will be in a bad mood.

Conclusion:

Contrapositive of a True statement is True (C.T.T.)

Premise: If Liam forgets his lunch, then he will be hungry.

Conclusion:

(C.T.T./L.O.D)

Premises: If Liam forgets his lunch, then he will be hungry. Liam wasn't hungry.

Conclusion:

**Don't forget about D.S. (____________________ ___________________)

Examples:

Section 2-5:

After this section you will have completed the following Common Core State Standard(s):

- **G.MG.3: Apply geometric methods to solve problems.**

And will be improving your skills in the following Mathematical Practice(s):

2. Reason abstractly and quantitatively

3. Construct viable arguments and critique the reasoning of others

Specifically, you should be able to:

- **Identify and use basic postulates about points, lines, and planes**
- **Write paragraph proofs**

Postulate/ Axiom:

Point Line and Plane Postulates:

2.1
2.2
2.3
2.4
2.5
2.6
2.7

Theorem:

Midpoint Theorem: If M is the midpoint of $\overline{AB}$, then ______________________

Proof:

Deductive Argument:

Paragraph Proof:

Examples:

Section 2-6:

After this section you will have completed the following Common Core State Standard(s):

- **Preparation for G.CO.9: Prove theorems about lines and angles**

And will be improving your skills in the following Mathematical Practice(s):

3. Construct viable arguments and critique the reasoning of others

Specifically, you should be able to:

- **Use algebra to write 2 column proofs**
- **Use properties of equality to write geometric proofs**

Algebraic Proof:

Algebraic Properties Of Equality:

Addition (A.P.O.E.): If a = b, then

Subtraction (S.P.O.E.):If a = b, then

Multiplication (M.P.O.E.):If a = b, then

Division (D.P.O.E.)If a = b, then

❖ Solve the following equation and write reasons next to each step.

$3(x-2)+2x=19$ given

Two Column Proof:

Reflexive: Any measure or shape is congruent to _______________:

Symmetric: The ___________ in which things are equal/congruent doesn't matter.

Transitive: If two things are equal/congruent to the same thing, then they are equal/congruent to __________________.

Substitution: If a = b, then b can be substituted in for a in any equation.

Note: Substitution can only be used with numbers/measures, not shapes.

Examples:

<u>Sec 2-7 & 2-8</u>:

After this section you will have completed the following Common Core State Standard(s):

- **G.CO.9: Prove theorems about lines and angles**

And will be improving your skills in the following Mathematical Practice(s):

2. Reason abstractly and quantitatively

3. Construct viable arguments and critique the reasoning of others

Specifically, you should be able to:

- **Write proofs involving segment and angle addition and segment congruence**
- **Write proofs involving supplementary and complementary angles**
- **Write proofs involving congruent and right angles**

<u>Segment Addition Postulate:</u>

<u>Angle Addition Postulate:</u>

<u>Linear Pair Postulate:</u> If two angles form a linear pair, then they are ___________________.

<u>Congruent Supplements/Complements Theorem:</u> Two angle that are supplementary/complementary to the same angle are ____________.

Proof:

Vertical Angles Theorem: If two angles are vertical angles, then they are ______________ .

Proof:

Other Theorems:

- Perpendicular lines intersect to form ___________________.
- All right angles are ________________.
- Perpendicular lines form ________________________________.
- If two angles are congruent and supplementary, then each angle is _____________________________.
- If two congruent angles form a linear pair, then each angle is ______________________________.

Examples: