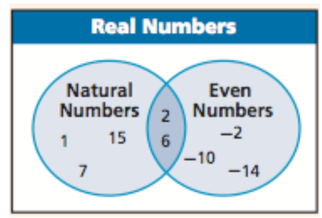
Geometry Enriched
Chapter 2 Study Guide (2.1-2.4, 2.6)

Inductive Reasoning: the process of reasoning based on specific true cases.
Deductive Reasoning: the process of using logic to draw conclusions from given facts, definitions, and properties.
Conjecture: a statement you believe to be true based on inductive reasoning.
Counterexample: one example in which a conjecture is not true.

Example Conjecture: For all positive numbers $n, \frac{1}{n} \le n$.

Counterexample: Let $n = \frac{1}{2}$. Since $\frac{1}{n} = \frac{1}{\frac{1}{2}} = 2$ and $2 \not\le \frac{1}{2}$, the conjecture is false.

Venn Diagrams: ovals are used to represent a set of like items. Ovals can overlap if sets share common elements.



Conditional Statement: a statement that can be written "if p, then q" or $p \to q$.

Hypothesis: the p of a conditional statement following the word "if".

Conclusion: the q of a conditional statement following the word "then".

Converse: a statement formed by exchanging the hypothesis and conclusion. "if q, then p."

Inverse: a statement formed by negating the hypothesis and the conclusion. "if not p, then not q."

Contrapositive: a statement formed by both exchanging and negating the hypothesis and conclusion. "if not q, then not p."

Biconditional Statement: a statement that can be written "p if and only if q" or $p \leftrightarrow q$.

Law of Detachment: If $p \to q$ is a true statement and p is true, then q is true.

Law of Syllogism: If $p \to q$ and $q \to r$ are true statements, then $p \to r$ is a true statement.

Postulates and Theorems

1.1.1 Through any two points there is exactly one line.
1.1.2 Through any three non-collinear points there is exactly one place containing them.
1.1.3 If two points lie in a plane, then the line containing those points lies in the plane
1.1.4 If two lines intersect, then they intersect in exactly one point.
1.1.5 If two planes intersect, then they intersect in exactly one line.
1.2.2 **Segment Addition Postulate**: If B is between A and C, then AB+BC=AC.
1.3.2 **Angle Addition Postulate**: If S is in the interior of $\angle PQR$, then $m\angle PQS + m\angle SQR = m\angle PQR$.
1.6.1 **Pythagorean Theorem**: $a^2 + b^2 = c^2$.
2.6.1 **Linear Pair Theorem**: If two angles form a linear pair, then they are supplementary.
2.6.2 **Congruent Supplements Theorem**: If two angles are supplementary to the same angle, then the two angles are congruent.

Properties of Equality

Addition Property of Equality: If a=b, then a+c = b+c.
Reflexive Property of Equality: a=a
Substitution Property of Equality: If a=b, then b can be substituted for a in any expression.

Reflexive Property of Congruence: $\overline{EF} \cong \overline{EF}$

Geometric Definitions

Midpoint: The point M of $\overline{AB}$ which bisects, or divides, the segment into two congruent segments.
Acute Angle: Measures greater than 0˚ and less than 90˚.
Right Angle: Measures 90˚.
Obtuse Angle: Measures greater than 90˚ and less then 180˚.
Straight Angle: Measures 180˚.
Congruent Angles: Angles that have the same measure.
Angle Bisector: A ray that divides an angle into two congruent angles.
Adjacent Angles: Two angles in the same plane with a common vertex and a common side, but no common interior points.
Complementary angles: Two angles whose measures sum of 90˚.
Supplementary angles: Two angles whose measures sum of 180˚.
Linear Pair: A pair of adjacent supplementary angles who non-common sides are opposite rays.

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Chapter 2 Practice Problems   Date _________________ Period ______

Show all work!!!

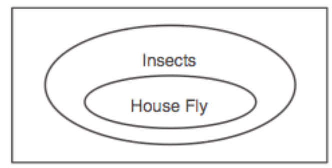
Make a conjecture about each pattern, then write or draw the next two terms.

1) A, E, F, H, I, ...

2) 

3) Rewrite this quote as a conditional: “Never put off till tomorrow what you can do today.” Thomas Jefferson.

4) Write a conditional statement for the information in this Venn diagram.



5) Draw a Venn diagram to represent the statement:
“ $p \rightarrow r$ and $q \rightarrow r$ are true, but $p \rightarrow q$ is not true”

6) Draw a conclusion from this given information:
“ If two segments intersect, then they are not parallel. If two segments are not parallel, then they could be perpendicular. $\overline{EF}$ and $\overline{MN}$ intersect.”

7) Determine whether a true biconditional can be written for this statement or give a counter example
“ If the lamp is unplugged, then the bulb does not shine.”

8) Write the definition as a biconditional. “A cube is a three-dimensional solid with six square faces.”

9) Refer to the diagram (on the right) of the stained-glass window and use the given plan to write a two-column proof.
Given: $\angle 1$ and $\angle 3$ are supplementary. $\angle 2$ and $\angle 4$ are supplementary. $\angle 3 \cong \angle 4$
Prove: $\angle 1 \cong \angle 2$