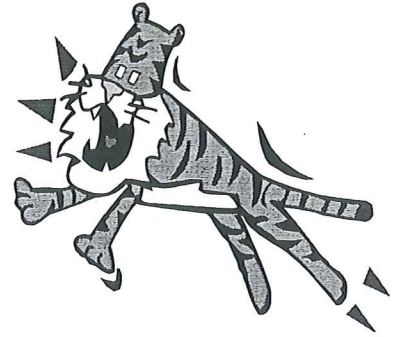


Name _____ Date _____ Hr _____



Geometry Notes: 2-3/2-4/2-5

• **2-3 Conditional statement:**

Example:

If the Tigers win the next game, then they will be division champions.

The hypothesis follows the "if". The conclusion follows the "then".

Using symbols to represent a conditional: $p \rightarrow q$, meaning if p, then q. Or meaning p implies q.

Example: Identify the hypothesis and conclusion of the following conditional statement.

If a polygon has six sides, then it is a hexagon.

hypothesis conclusion

Example: Write the following statements in if-then form. Then identify the hypothesis and conclusion.

1. *Distance is positive.*

IF a distance is determined, then it is positive.

2. *A 5-sided polygon is a pentagon.*

IF a polygon has 5 sides, then it is a pentagon.

- **truth value:** The hypothesis, conclusion, or the entire stmt may be True or False
- **Converse of a conditional statement:** exchange hypothesis & conclusion

Using symbols, we represent the converse by q \rightarrow p.

- Example: Write the converse of the following true statements. Determine the truth value of the converse.

1. *If 2 angles form a linear pair, then they are supplementary.*

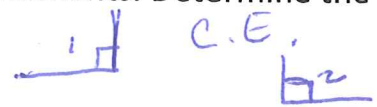
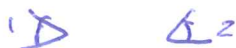
IF 2 angles are supplementary, then they form a linear pair T or F

2. *If a line bisects a segment, then it intersects the segment at its midpoint.*

IF A segment intersects a line at its midpoint, then T or F

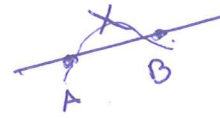
3. *Vertical angles are congruent.*

IF two angles are congruent, then they are vertical. T or F



2-4 Deductive Reasoning: A system of reasoning that uses rules, facts, definitions, or properties to reach logical conclusions.

2-5 Postulates and Paragraph Proofs



P2.1 Through any 2 points, there is exactly 1 line.

P2.2 Through any 3 ~~points~~ ^{noncollinear} points, there is exactly one plane.

P2.3 A line contains at least 2 points.

P2.4 A plane contains at least 3 non collinear points.



P2.5 If 2 points lie in a plane, the entire line containing them lies in the plane.

P2.6 If 2 lines intersect, then their intersection is exactly 1 point.



P2.7 If 2 planes intersect, then their intersection is exactly 1 line.

A proof is logical argument which each statement is supported by a statement that is accepted to be true

Paragraph Proof:

Written in Paragraph form

Four Parts to a Good Proof:

1. State a theorem or conjecture to be proven
2. List the given info and draw a diagram to illustrate it.
3. State what is proved
4. Develop a system of deductive reasoning

Review Properties

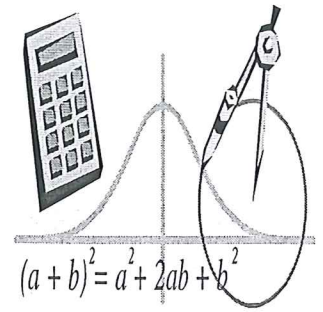
1. **Midpoint Theorem:** If M is the midpoint of \overline{AB} , then $\overline{AM} \cong \overline{MB}$

2. **Definition of Congruence:**



two equal measures.

Notes Geometry 2/6
Algebraic Proof



Review Properties from Algebra

1. **Addition/Subtraction:** IF $a=b$, then $a+c = b+c$
 $3x-6 = 42$ IF $a=b$, then $a-c = b-c$
 $3x-6+6 = 42+6$
2. **Multiplication/Division:** IF $a=b$, then $a \cdot c = b \cdot c$
 $3x = 48$ IF $a=b$, then $\frac{a}{c} = \frac{b}{c}$
 $\frac{3x}{3} = \frac{48}{3}$
3. **Substitution:** For all #'s a and b , if $a=b$ then a may be replaced by b in any expression or equation.
 (simplify) $\frac{48}{3} = 16$
4. **Distributive:** For all #'s a, b , and c $a(b+c) = a \cdot b + a \cdot c$
 $3(x-2) = 42$
 $3x-6 = 42$

Note: The Algebraic properties above only apply in EQUATIONS! (There must be an equals sign (=) to use them!!!)

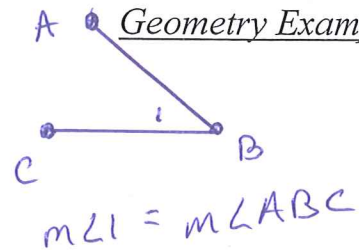
New Properties

Algebra Example

Geometry Example

5. **Reflexive:**

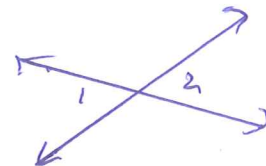
$a = a$



6. **Symmetric:** IF $a=b$, then $b=a$

$6 = x$

$x = 6$



$m\angle 1 = m\angle 2$

$m\angle 2 = m\angle 1$

7. **Transitive:**

IF $a=b$, and $b=c$ then $a=c$

IF $m\angle 1 = m\angle 2$ and

$m\angle 2 = m\angle 3$, then

$m\angle 1 = m\angle 3$

2-6 Skills Practice

Algebraic Proof

Lesson 2-6

State the property that justifies each statement.

- If $80 = m\angle A$, then $m\angle A = 80$. *Symmetric Property*
- If $RS = TU$ and $TU = YP$, then $RS = YP$. *Transitive*
- If $\frac{7x}{7} = \frac{28}{7}$, then $x = 4$. ** Division*
** Substitution*
- If $VR + TY = EN + TY$, then $VR = EN$. *Addition Property*
- If $m\angle 1 = 30$ and $m\angle 1 = m\angle 2$, then $m\angle 2 = 30$. *Transitive*

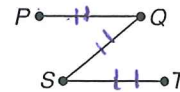
Complete the following proof.

6. Given: $8x - 5 = 2x + 1$ *
Prove: $x = 1$
Proof:

Statements	Reasons
a. $8x - 5 = 2x + 1$	a. * Given
b. $8x - 5 - 2x = 2x + 1 - 2x$	b. <i>Subtraction Property</i>
c. $6x - 5 = 1$	c. Substitution Property
d. $6x - 5 + 5 = 1 + 5$	d. Addition Property
e. $6x = 6$	e. <i>Substitution</i>
f. $\frac{6x}{6} = \frac{6}{6}$	f. <i>Division Property</i>
g. $x = 1$	g. <i>Substitution</i>

Write a two-column proof for the following.

7. If $\overline{PQ} \cong \overline{QS}$ and $\overline{QS} \cong \overline{ST}$, then $PQ = ST$.



Given: $\overline{PQ} \cong \overline{QS}$
 $\overline{QS} \cong \overline{ST}$

Prove $PQ = ST$

Statements	Reasons
1) $\overline{PQ} \cong \overline{QS}$ $\overline{QS} \cong \overline{ST}$	1) Given
2) $PQ = QS$ $QS = ST$	2) Definition of congruent segments
3) $PQ = ST$	3) Transitive Property