


## Thursday, November 16th

- today you will be completing an in-class assignment... done individually but can use your notes/text.

### **Assignment - Angle Properties.pdf**

- when finished,  pass in to the folder up front.
- begin working on the following questions from the text...

**HOMEWORK:** p. 104 #1 & 2

p. 106 #1 - 5

**NOTE:** Give period 5 this to do over the weekend since they are missing tomorrow's class for BBall game...

### **Assignment - Logical Thinking Nov. 2017.pdf**

Questions from last week...

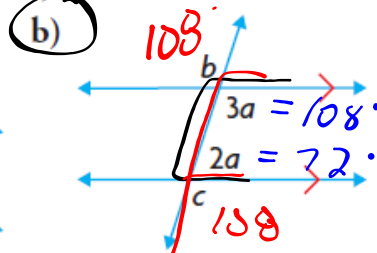
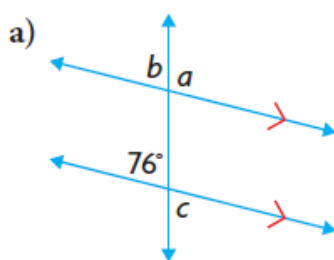
**HOMEWORK:** p. 104 #1 & 2

p. 106 #1 - 5

1. Kamotiqs are sleds that are dragged behind vehicles, such as snowmobiles, over snow and sea ice. Identify a set of parallel lines and a transversal in the photograph of a kamotiq.



5. Determine the values of  $a$ ,  $b$ , and  $c$ .



$$3a + 2a = 180$$

$$5a = 180$$

$$a = 36$$

## Geometric Proofs... The 'Two-Column Proof'

Key Terms (in your notes)...

Notes - Chp. 2.pdf

### deductive reasoning

Drawing a specific conclusion through logical reasoning by starting with general assumptions that are known to be valid.

### proof

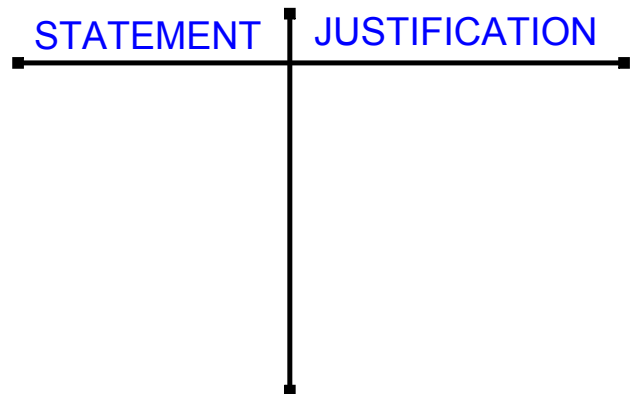
A mathematical argument showing that a statement is valid in all cases, or that no counterexample exists.

### transitive property

If two quantities are equal to the same quantity, then they are equal to each other.  
If  $a = b$  and  $b = c$ , then  $a = c$ .

### two-column proof

A presentation of a logical argument involving deductive reasoning in which the statements of the argument are written in one column and the justifications for the statements are written in the other column.



\*\*\*ADD this one to your notes...

**converse**  
A statement that is formed by switching the premise and the conclusion of another statement.

## EXAMPLES...

**Conjecture:** If it is raining outside, then the grass is wet.

**CONVERSE:** If the grass is wet, then it is raining.

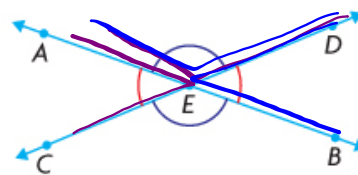
**THEOREM:** If you have parallel lines, then the corresponding angles are equal.

**CONVERSE:** If the corresponding angles are equal, then the lines are parallel.

p. 29

**EXAMPLE 4** Using deductive reasoning to prove a geometric conjecture

Prove that when two straight lines intersect, the vertically opposite angles are equal.



**Jose's Solution: Reasoning in a two-column proof**

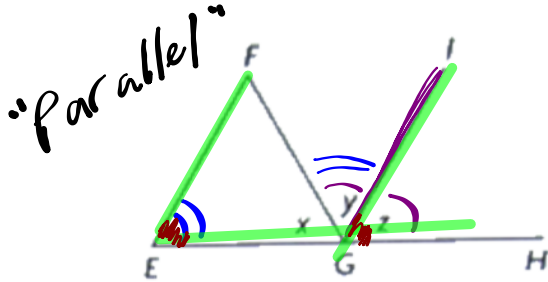
Statement	Justification
$\angle AEC + \angle AED = 180^\circ$	Supplementary angles <i>OR SAT</i>
$\angle AEC = 180^\circ - \angle AED$	Subtraction property
$\angle BED + \angle AED = 180^\circ$	Supplementary angles <i>SAT</i>
$\angle BED = 180^\circ - \angle AED$	Subtraction property
$\angle AEC = \angle BED$	<b>Transitive property</b>

**Example #2:**

NOTE: 3 Ways to prove Parallel Lines  
 ① CA ② AIA ③ CIA

In  $\triangle EFG$ ,  $GI$  bisects  $\angle FGH$

a) If  $\angle E = \angle y$ , then prove that  $EF \parallel GI$

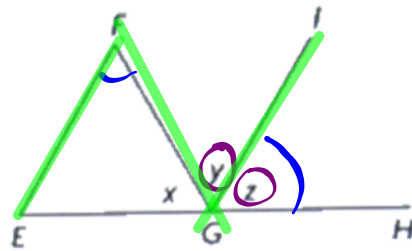


Statement	Justification
$\angle E = \angle y$	Given
$\angle y = \angle z$	Bisect
$\angle E = \angle z$	Transitive
$\therefore EF \parallel GI$	CA

Therefore

In  $\triangle EFG$ ,  $GI$  bisects  $\angle FGH$

b) If  $\angle F = \angle z$ , then prove that  $EF \parallel GI$



Statement	Justification
$\angle y = \angle z$	Bisect
$\angle F = \angle z$	Given
$\angle F = \angle y$	Transitive
$\therefore EF \parallel GI$	AIA

## APPLY the Math

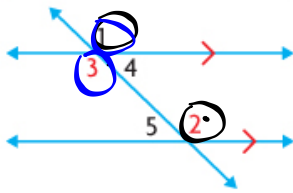
EXAMPLE 1  
p. 75

Reasoning about conjectures involving angles formed by transversals

Make a conjecture that involves the interior angles formed by parallel lines and a transversal. Prove your conjecture.

### Tuyet's Solution

My conjecture: When a transversal intersects a pair of parallel lines, the **alternate interior angles** are equal.



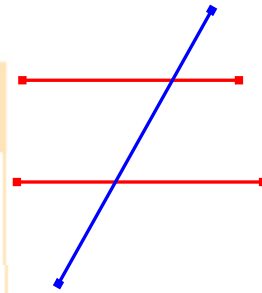
I drew two parallel lines and a transversal as shown, and I numbered the angles. I need to show that  $\angle 3 = \angle 2$ .

Statement	Justification
$\angle 1 = \angle 2$	Corresponding angles
$\angle 1 = \angle 3$	Vertically opposite angles
$\angle 3 = \angle 2$	Transitive property
My conjecture is proved.	

Since I know that the lines are parallel, the corresponding angles are equal.

When two lines intersect, the opposite angles are equal.

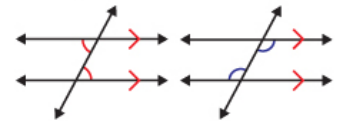
$\angle 2$  and  $\angle 3$  are both equal to  $\angle 1$ , so  $\angle 2$  and  $\angle 3$  are equal to each other.



Pull for Lesson Notes

### alternate interior angles

Two non-adjacent interior angles on opposite sides of a transversal.





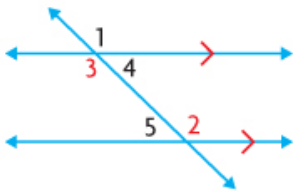
**EXAMPLE 1**

**Reasoning about conjectures involving angles formed by transversals**

Make a conjecture that involves the interior angles formed by parallel lines and a transversal. Prove your conjecture.

**Ali's Solution**

My conjecture: When a transversal intersects a pair of parallel lines, the interior angles on the same side of the transversal are supplementary.



$$\angle 1 = \angle 2$$

$$\angle 2 + \angle 5 = 180^\circ$$

$$\angle 1 + \angle 5 = 180^\circ$$

$$\angle 1 = \angle 3$$

$$\angle 3 + \angle 5 = 180^\circ$$

My conjecture is proved.

I need to show that  $\angle 3$  and  $\angle 5$  are supplementary.

Since the lines are parallel, the corresponding angles are equal.

These angles form a straight line, so they are supplementary.

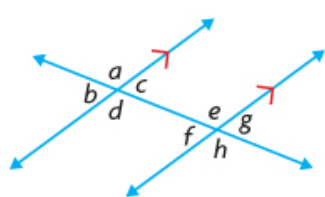
Since  $\angle 2 = \angle 1$ , I could substitute  $\angle 1$  for  $\angle 2$  in the equation.

Vertically opposite angles are equal. Since  $\angle 1 = \angle 3$ , I could substitute  $\angle 3$  for  $\angle 1$  in the equation.

## In Summary p. 78

### Key Idea

- When a transversal intersects two parallel lines,
  - the corresponding angles are equal.
  - the alternate interior angles are equal.
  - the alternate exterior angles are equal.
  - the interior angles on the same side of the transversal are supplementary.



$$\text{i) } a = e, b = f \\ c = g, d = h$$

$$\text{ii) } c = f, d = e$$

$$\text{iii) } a = h, b = g$$

$$\text{iv) } c + e = 180^\circ \\ d + f = 180^\circ$$

### Need to Know

- If a transversal intersects two lines such that
  - the corresponding angles are equal, or
  - the alternate interior angles are equal, or
  - the alternate exterior angles are equal, or
  - the interior angles on the same side of the transversal are supplementary,
 then the lines are parallel.

*Homework...*

*p. 72: #4-6*

*p. 78: #2, 8, 10, 12, 20*



## Attachments

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Unit 2 Review and Crossword.pdf

Assignment - Angle Properties.pdf

Assignment - Logical Thinking Nov. 2017.pdf

Notes - Chp. 2.pdf