

Name: \_\_\_\_\_

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Block: \_\_\_\_\_

## Chapter 2 - Geometry Review

### Using Inductive Reasoning

1. What is the next item in each pattern?

a. 1, -3, 9, -27, ....

81

b. 2, 5, 9, 14, 20, ....

27

2. Which equation models the number of dots in the  $n$ th term?

n	1	2	3	4	n = term
$a_n$	7	10	13	16	$a_n = \# \text{ dots in term}$

a.  $a_n = 7x + 1$

b.  $a_n = 4x + 3$

c.  $a_n = 3x + 4$

d.  $a_n = x + 7$

### Conditional Statements

3. Give a counterexample to show that the following conjecture is false: "If  $\angle 1$  and  $\angle 2$  are complementary, then the angles are not congruent."

$$m\angle 1 = m\angle 2 = 45^\circ$$

4. Give a counterexample to show that the following conjecture is false: "If  $\angle 1$  and  $\angle 2$  are congruent, then they are both obtuse angles."

$$m\angle 1 = 30$$

$$m\angle 2 = 30$$

5. Determine if the following are true. If false, give a counterexample.

a. If  $9x - 11 = 2x + 3$ , then  $x = 2$ .

True

b. If an angle is acute, then it has a measure of  $30^\circ$ .

False,  $40^\circ$

6. Write a conditional statement from the Venn Diagram.

If it is Monday then  
it is a weekday.



7. Write the converse, inverse, and contrapositive. Determine if each statement is true or false.

"If you live in Oklahoma, then you live in the United States."

F

Converse: If you live in US, then live in OK.

F

Inverse: If don't live in OK, then don't live in US.

T

Contrapositive: If don't live in US, then don't live in OK.

### Using Deductive Reasoning

8. Use the true statements below to determine whether each conclusion is true or false.

"Sue is a member of the swim team. When the team practices, Sue swims. The team begins practice when the pool opens. The pool opens at 8 AM on weekdays and at noon on Saturdays."

- a. The swim team practices on weekdays only. F
- b. Sue swims on Saturdays. T
- c. Swim team practice starts at the same time every day. F

9. Which conclusion is valid for the situation below?

If two angles are complementary, then the sum of their measures is  $90^\circ$ .

$\angle A$  and  $\angle B$  are complementary.

- a.  $m\angle A = 90^\circ$
- b.  $m\angle A = 90^\circ + m\angle B$
- c.  $m\angle A + m\angle B = 90^\circ$
- d.  $\angle A$  and  $m\angle B$  form a right angle.

### Bi-conditional Statements

10. Write the following statements as bi-conditional statements.

- a. The measure of a right angle is  $90^\circ$ .

An angle is right iff the measure is  $90^\circ$ .

- b. If this month is September, then next month is October.

This month is Sept. iff next month is October.

## 2.5 Algebraic Proof

11. Solve each problem for the missing variable. Write a justification for each step.

a.  $\frac{m}{-5} + 3 = -4.5$

S	R
$\frac{m}{-5} + 3 = -4.5$	1. given
$\frac{m}{-5} - 3 = -4.5 - 3$	2. Subst. POE
$\frac{m}{-5} = -7.5$	3. Simplify
$m = 37.5$	4. Mult. POE
	5. Simplify

b.

S	R
$\begin{array}{c} \text{A} \quad \text{B} \quad \text{C} \\ \text{---} 47 \text{---} \text{---} 3x \text{---} \\ \text{---} 59 \text{---} \end{array}$	
1. $AB = 47$ $BC = 3x$ $AC = 59$	1. given
2. $AB + BC = AC$	2. Seg. Add Post
3. $47 + 3x = 59$	3. Subst.
4. $3x = 12$	4. Subst. POE
5. $x = 4$	5. Div POE

12. Identify the property that justifies each statement.

- L a.  $25 = 25$   
B b. If  $\angle RST \cong \angle ABC$ , then  $\angle ABC \cong \angle RST$   
J c.  $2x = 9$ , and  $y = 9$ , so  $2x = y$ .  
C d.  $\angle XYZ \cong \angle XYZ$   
G e. If  $x = y$ , then  $x + 5 = y + 5$   
E f. If  $x = y$ , then  $2x = 2y$ .  
H g.  $3(x + y) = 3x + 3y$   
K h. If  $x = y$ , then  $y = x$ .  
D i. If  $x = y$ , then  $\frac{x}{w} = \frac{y}{w}$ .  
F j. If  $x = y$ , then  $x - 7 = y - 7$

- A. Transitive Property of Congruence  
 B. Symmetric Property of Congruence  
 C. Reflexive Property of Congruence  
 D. Division Property of Equality  
 E. Mult. Property of Equality  
 F. Subtraction Property of Equality  
 G. Addition Property of Equality  
 H. Distributive Property  
 I. Substitution Property of Equality  
 J. Transitive Property of Equality  
 K. Symmetric Property of Equality  
 L. Reflexive Property of Equality

## 2.6 Geometric Proof

13. Write a justification for each step. Given:  $\angle 1$  and  $\angle 2$  complementary and  $\angle 1 \cong \angle 3$ .

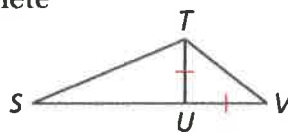
S	R
1. $\angle 1$ and $\angle 2$ complementary	1. given
2. $m\angle 1 + m\angle 2 = 90^\circ$	2. Def of comp $\angle$ 's
3. $\angle 1 \cong \angle 3$	3. given
4. $m\angle 1 = m\angle 3$	4. Def of $\cong \angle$ 's
5. $m\angle 3 + m\angle 2 = 90^\circ$	5. Subst.
6. $\angle 3$ and $\angle 2$ complementary	6. Def of comp. $\angle$ 's

14. Fill in the blanks to complete the two-column proof.

Given:  $\overline{TU} \cong \overline{UV}$

Prove:  $SU + TU = SV$

Two-column proof:



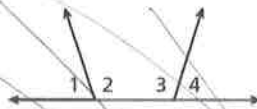
Statements	Reasons
1. $\overline{TU} \cong \overline{UV}$	1. a. given
2. b. $TU = UV$	2. Def. of $\cong$ segs.
3. c. $SU + UV = SV$	3. Seg. Add. Post.
4. $SU + TU = SV$	4. d. subst.

15. Fill in the blanks to complete the two-column proof.

Given:  $m\angle 1 + m\angle 3 = 180^\circ$

Prove:  $\angle 1 \cong \angle 4$

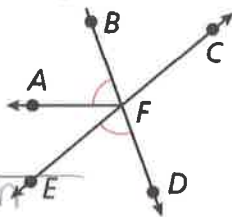
Proof:



Statements	Reasons
1. $m\angle 1 + m\angle 3 = 180^\circ$	1. a. given
2. b. ?	2. Def. of supp. $\angle$
3. $\angle 3$ and $\angle 4$ are supplementary.	3. Lin. Pair Thm.
4. $\angle 3 \cong \angle 4$	4. c. <del>refl</del> POC
5. d. $\angle 1 \cong \angle 4$	5. $\cong$ Supps. Thm.

16. Given:  $\angle AFB \cong \angle EFD$

Prove:  $\overrightarrow{FB}$  bisects  $\angle AFC$



- $\angle AFB \cong \angle EFD$
- $m\angle AFB = m\angle EFD$
- $\angle EFD, \angle BFC$  vert.  $\angle$ 's
- $\angle EFD \cong \angle BFC$
- $m\angle EFD = m\angle BFC$
- $m\angle AFB = m\angle BFC$
- $\angle AFB \cong \angle BFC$
- $\overrightarrow{FB}$  bisects  $\angle AFC$

- given
- Def of  $\cong$   $\angle$ 's
- Def of vert.  $\angle$ 's
- Vert.  $\angle$ 's Thm
- Def of  $\cong$   $\angle$ 's
- Trans POE
- Def of  $\cong$   $\angle$ 's
- Def of  $\angle$  Bisector

17. Given:  $\angle 1$  and  $\angle 2$  are straight angles.

Prove:  $\angle 1 \cong \angle 2$

- $\angle 1, \angle 2$  straight  $\angle$ 's
- $m\angle 1 = 180$   
 $m\angle 2 = 180$
- $m\angle 1 = m\angle 2$
- $\angle 1 \cong \angle 2$

- given
- Def of straight  $\angle$ 's
- Trans POE
- Def of  $\cong$   $\angle$ 's

