Unit 10 Check Sheet
Name ______________________________Per______
(Print)

Reasoning & Proofs

- Check sheet must be turned in to receive Homework & Quiz points.
- All quiz corrections must be done for test score to replace quiz scores.
- No check sheet = No Points.
- Write quiz scores as fractions
- Lost Quizzes count as a 0.
- Quiz ratio is total points scored on quizzes and pre-test out of total possible
- Order (from top to bottom)
  - o Check sheet,
  - o **Quiz 1, 2, Pre-Test**
  - o **Quiz corrections**

Section		HMK
10.2	**Patterns and Inductive Reasoning (Counterexample Only)** **Worksheet 10.2 #1-7all**	
10.3	**Conditional Statements (Conditional and Converses Only)** **Worksheet 10.3 #1-18 all**	
10.4	**Biconditionals and Definitions** **Worksheet 10.4 #1-16 all** **Quiz 1**	
10.6	**Reasoning in Algebra and Geometry** **Worksheet 10.6 #1-14 all**	
10.7	**Proving Angles Congruent** **Worksheet 10.7 #1-17 all** **Quiz 2**	
Review	**Review WS 1 #1-11 all**	
Unit Test		

Quiz 1: ________
Score/Possible

Quiz 2: ________
Score/Possible

Pre-Test: ________
Score/Possible

Total Quiz Ratio: ________
Total Score/Total Possible

Name ______________________ Class __________ Date __________

10.2 Practice

Form K

Patterns and Inductive Reasoning

One way to show that a conjecture is not true is to find a **counterexample**. A *counterexample* is an instance in which the conjecture or pattern does not work. **Only one counterexample is needed to prove a conjecture false**. For example, one rainy or cool day in Clovis would prove that it is not always hot and dry here.

What is a counterexample for each conjecture?

1. If the sidewalk is wet, then it rained last night.

2. If a person is running, then they are an athlete.

3. Numbers that end in 2, 4, 6, or 8 are the only even numbers.

4. If a quadrilateral has four sides, then it is a square.

Find one counterexample to show that each conjecture is false.

5. The product of two positive numbers is greater than either number.

6. The difference of two integers is less than either integer.

7. Known: $AB = BC$
   Conjecture: B is the midpoint of $\overline{AC}$.

Name ________________________________ Class _____________ Date _____________

10.3 Practice

Form K

Conditional Statements

Identify the <u>hypothesis</u> and <u>conclusion</u> of each conditional.

1. If the shoe fits, then you can wear it.

2. If you are a lawyer, then you passed the bar exam.

3. If it is a fish, then it lives in water.

Write each sentence as a conditional.

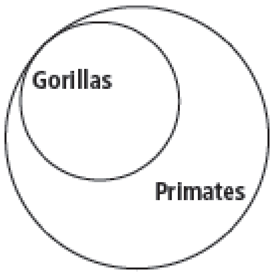
4. Odell Beckham can catch footballs with one hand

5. The slope of a line is same thing as the rate of change.

6. A decibel is a measurement of the intensity of a sound.

Write a conditional statement that each Venn diagram illustrates.

7.



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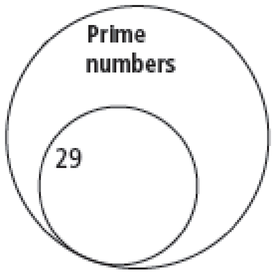

Determine if the conditional is *true* or *false.* If it is false, find a counterexample.

9. If an animal has wings, then it is a bird.

10. If it is after sunset, you can see the stars.

Name ______________________________ Class ____________ Date ____________

Practice (continued)

Form K

Conditional Statements

Write the converse of the given conditional statement. Determine whether the converse is true or false. If a statement is false, give a counterexample.

11. If three points are not on the same line, then they are noncollinear.

12. If it is an obtuse angle, then it has a measure greater than 90 degrees.

13. If you do not live in Sacramento, then you do not live in California.

14. If *n* is an even number, then *n* is divisible by 2.

Write the converse of each statement. If the converse is true, write *true.* If it is not true, provide a counterexample.

15. If it is snowing, then it is cloudy.

16. All rectangles are quadrilaterals.

17. All students like chocolate.

18. All right triangles have two or more congruent angles.

Name ________________________________ Class _____________ Date _____________

10.4 Practice

Form K

Biconditionals and Definitions

Each conditional statement below is true. Write its converse. If the converse is also true, combine the statements as a biconditional.

1. If point B lies on $\overline{AC}$, then $AB + BC = AC$.

2. If two lines intersect to form adjacent congruent angles, then the lines are perpendicular.

3. If two angles are right angles, then they are congruent.

Write the two statements that form each biconditional.

4. The product of two numbers is a perfect square if and only if the two numbers are identical.

5. A figure is three-dimensional if and only if it has length, width, and height.

Test each statement below to see if it is reversible. If so, write it as a true biconditional. If not, write *not reversible.*

6. A linear pair consists of two angles with measures that sum to 180.

7. Two angles that are complements of the same angle are congruent.

Name ______________________________ Class ____________ Date ____________

Practice (continued) *Form K*

Biconditionals and Definitions

Is each statement below a good definition? If not, explain.

8. Linear pairs of angles are two adjacent angles that share one side, and the sides they do not share are opposite rays.

9. A Rhombus is a quadrilateral with four congruent sides.

10. A rectangle has two pairs of opposite sides that are congruent.

11. Opposite rays are two rays that share the same endpoint.

Tell whether each conditional and its converse form a true biconditional.

12. If a figure is a square, then is is a rhombus.

13. If a figure is a square, then it is a rectangle.

14. If a triangle is equilateral, then its angles each measure 60.

Write each statement as a biconditional.

15. If two angles are supplementary, the sum of their measures is 180 degrees.

16. In the equation $y = ax^2 + bx + c$, if a is positive, the parabola opens upward.

Name ________________________________ Class _____________ Date _____________

10.6 Practice

Form K

Reasoning in Algebra and Geometry

Fill in the reason behind each algebraic statement for numbers 1-3.

1. $\frac{2}{3}x+6=14$ Given

$3(\frac{2}{3}x+6)=42$ **a.** ___?___

$2x + 18 = 42$ **b.** ___?___

$2x = 24$ **c.** ___?___

$x = 12$ **d.** ___?___

2. $2(x - 12) = 40$ Given

$2x - 24 = 40$ **a.** ___?___

$2x = 64$ **b.** ___?___

$x = 32$ **c.** ___?___

3.

$AB = 50$ Given

$AC + CB = AB$ **a.** ___?___

$2x - 2 + 4(x + 1) = 50$ **b.** ___?___

$2x - 2 + 4x + 4 = 50$ **c.** ___?___

$6x + 2 = 50$ **d.** ___?___

$6x = 48$ **e.** ___?___

$x = 8$ **f.** ___?___

Name the property of equality or congruence that justifies going from the first statement to the second statement.

4. $QR + LM = 20$

$QR = 20 - LM$

5. $\overline{ST} \cong \overline{ST}$

$\overline{ST} \cong \overline{ST}$

6. $3x = y$

$x = \frac{y}{3}$

7. $3(2x - 1) = 0$

$6x - 3 = 0$

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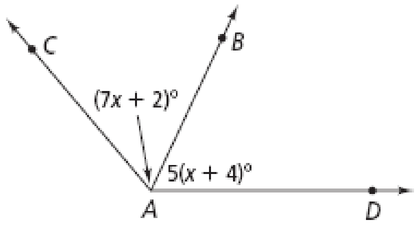
Practice (continued) *Form K*

Reasoning in Algebra and Geometry

8. Developing Proof Fill in the missing statements or reasons for the following two-column proof.



Given: $\overrightarrow{AB}$ is the bisector of $\angle CAD$.
Prove: $x = 9$

Statements	Reasons
1) $\overrightarrow{AB}$ is the bisector of $\angle CAD$.	1) Given
2) $\angle CAB \cong \angle BAD$	2) ___?___
3) $m\angle CAB \cong m\angle BAD$	3) $\cong$ angles have equal measures.
4) $7x + 2 = 5(x + 4)$	4) ___?___
5) $7x + 2 = 5x + 20$	5) ___?___
6) ___?___	6) ___?___
7) ___?___	7) ___?___

Use the given property to complete each statement.

9. Addition Property of Equality
If $a = b$, then $a + 6 = b$ ___?___

10. Symmetric Property of Congruence
If $\overline{LM} \cong \overline{GH}$, then $\overline{GH} \cong$ ___?___ .

11. Distributive Property
$10x - 5 = 5 \bullet$ (___?___)

12. Addition Property of Equality
If $\frac{2}{5}x = 10$, then $2x =$ ___?___

13. Substitution Property of Equality
If $JK = 20$ and $AB + JK = XY$, then ___?___ $= XY$.

14. Transitive Property of Congruence
If $\angle R \cong \angle Z$ and $\angle Z \cong \angle F$, then ___?___ $\cong \angle F$.

Name ______________________ Class ____________ Date ____________

10.6 Practice

Form K

Triangle Congruence by ASA and AAS

Name the two triangles that are congruent by ASA.

1.

$\frac{2}{3}x+6=14$	Given
$3(\frac{2}{3}x+6)=42$	**a.** ?
$2x + 18 = 42$	**b.** ?
$2x = 24$	**c.** ?
$x = 12$	**d.** ?

2.

$2(x - 12) = 40$	Given
$2x - 24 = 40$	**a.** ?
$2x = 64$	**b.** ?
$x = 32$	**c.** ?

3. 

$AB = 50$	Given
$AC + CB = AB$	**a.** ?
$2x - 2 + 4(x + 1) = 50$	**b.** ?
$2x - 2 + 4x + 4 = 50$	**c.** ?
$6x + 2 = 50$	**d.** ?
$6x = 48$	**e.** ?
$x = 8$	**f.** ?

Name the property of equality or congruence that justifies going from the first statement to the second statement.

4. $QR + LM = 20$

$QR = 20 - LM$

To start, determine which operation changes the first statement to the second statement.

5. $\overline{ST} \cong \overline{ST}$

$\overline{ST} \cong \overline{ST}$

6. $3x = y$

$x = \frac{y}{3}$

7. $6x = y$

$3(2x - 1)$

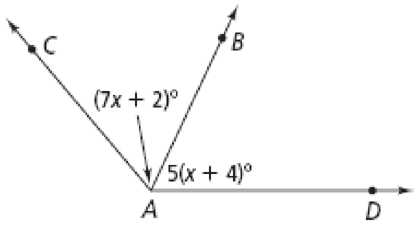
Name ______________________________ Class ____________ Date ____________

Practice (continued) *Form K*

Reasoning in Algebra and Geometry

8. Developing Proof Fill in the missing statements or reasons for the following two-column proof.

Given: $\overrightarrow{AB}$ is the bisector of $\angle CAD$.
Prove: $x = 9$



Statements	Reasons
1) $\overrightarrow{AB}$ is the bisector of $\angle CAD$.	1) Given
2) $\angle CAB \cong \angle BAD$	2) ___?___
3) $m\angle CAB \cong \angle BAD$	3) $\cong$ angles have equal measures.
4) $7x + 2 = 5(x + 4)$	4) ___?___
5) $7x + 2 = 5x + 20$	5) ___?___
6) ___?___	6) ___?___
7) ___?___	7) ___?___

Use the given property to complete each statement.

9. Addition Property of Equality
If $a = b$, then $a + 6 = b$ ___?___

10. Symmetric Property of Congruence
If $\overline{LM} \cong \overline{GH}$, then $\overline{GH} \cong$ ___?___ .

11. Distributive Property
$10x - 5 = 5 \bullet$ (___?___)

12. Addition Property of Equality
If $\frac{2}{5}x = 10$, then $2x =$ ___?___

13. Substitution Property of Equality
If $JK = 20$ and $AB + JK = XY$, then ___?___ $= XY$.

15. Transitive Property of Congruence
If $\angle R \cong \angle Z$ and $\angle Z \cong \angle F$, then ___?___ $\cong \angle F$.

Algebraic Properties and Proofs

Name ________________________

You have solved algebraic equations for a couple years now, but now it is time to justify the steps you have practiced and now take without thinking… and acting without thinking is a dangerous habit!

The following is a list of the reasons one can give for each algebraic step one may take.

ALGEBRAIC PROPERTIES OF EQUALITY	
ADDITION PROPERTY OF EQUALITY	If $a = b$, then $a + c = b + c$
SUBTRACTION PROPERTY OF EQUALITY	If $a = b$, then $a - c = b - c$
MULTIPLICATION PROPERTY OF EQUALITY	If $a = b$, then $a \cdot c = b \cdot c$
DIVISION PROPERTY OF EQUALITY	If $a = b$, then $\frac{a}{c} = \frac{b}{c}$
DISTRIBUTIVE PROPERTY OF MULTIPLICATION OVER ADDITION or OVER SUBTRACTION	$a(b + c) = ab + ac$ $a(b - c) = ab - ac$
SUBSTITUTION PROPERTY OF EQUALITY	If $a = b$, then b can be substituted for a in any equation or expression
REFLEXIVE PROPERTY OF EQUALITY	For any real number a, $a = a$
SYMMETRIC PROPERTY OF EQUALITY	If $a = b$, then $b = a$
TRANSITIVE PROPERTY OF EQUALITY	If $a = b$ and $b = c$, then $a = c$

Complete the following algebraic proofs using the reasons above. If a step requires simplification by combining like terms, write ***simplify***.

Given: $3x + 12 = 8x - 18$

Prove: $x = 6$

Statements	Reasons
1. $3x + 12 = 8x - 18$	1.
2. $12 = 5x - 18$	2.
3. $30 = 5x$	3.
4. $6 = x$	4.
5. $x = 6$	5.

Given: $3k + 5 = 17$
Prove: $k = 4$

Statements	Reasons
1. $3k + 5 = 17$	1.
2. $3k = 12$	2.
3. $k = 4$	3.

Given: $-6a - 5 = -95$
Prove: $a = 15$

Statements	Reasons

Given: $3(5x + 1) = 13x + 5$
Prove: $x = 1$

Statements	Reasons

Given: $7y - 84 = 2y + 61$

Prove: $y = 29$

Statements	Reasons

Given: $4(5n + 7) - 3n = 3(4n - 9)$

Prove: $n = -11$

Statements	Reasons

Given: $4.7 \quad 2f - 0.5 \quad = -6 \quad 1.6f - 8.3f$

Prove: $y = -\frac{47}{616}$

Statements	Reasons

Geometric Properties

We have discussed the RST (Reflexive, Symmetric, and Transitive) properties of equality. We could prove that these also apply for congruence… but we won't. We are just going to accept it…

I know, you're disappointed.

PROPERTIES OF CONGRUENCE	
REFLEXIVE PROPERTY OF CONGRUENCE	For any geometric figure *A*, $A \cong A$.
SYMMETRIC PROPERTY OF CONGRUENCE	If $A \cong B$, then $B \cong A$.
TRANSITIVE PROPERTY OF CONGRUENCE	If $A \cong B$ and $B \cong C$, then $A \cong C$
Additional Reasons for Proofs	
DEFINITIONS	
POSTULATES	
PREVIOUSLY PROVED THEOREMS	
ALGEBRAIC PROPERTIES	

Elementary Geometric Proofs

Using Definitions

Given: $\overline{XY} \cong \overline{BC}$

Prove: $XY = BC$

Statements	Reasons

Given: $\angle A \cong \angle Z$

Prove: $m\angle A = m\angle Z$

Statements	Reasons

Using the Transitive Property and Substitution

Given: $m\angle 1 = 45^\circ$; $m\angle 2 = m\angle 1$

Prove: $m\angle 2 = 45^\circ$

Statements	Reasons

You should be aware that there are many ways to complete a proof. In fact, the following website has 79 distinct proofs for the most famous of all theorems, the Pythagorean Theorem.

http://www.cut-the-knot.org/pythagoras/index.shtml

Even the simple proof above could be done in at least two ways. The last statement could have been justified using SUBSTITUTION or the TRANSITIVE PROPERTY. These properties are similar, but no the same:

SUBSTITUTION works only on NUMBERS (=), while the TRANSITIVE PROPERTY can be used to describe relationships between FIGURES or NUMBERS (= or ≅). Keep this in mind.

Given: $\angle 1 \cong \angle 2$; $\angle 1 \cong \angle 3$

Prove: $\angle 2 \cong \angle 3$

Statements	Reasons

Using Multiple Reasons

Given: $m\angle A = 90^\circ$; $\angle A \cong \angle Z$

Prove: $\angle Z$ is a right angle

Statements	Reasons

Given: $m\angle 1 = 90^\circ$; $\angle 1 \cong \angle 2$; $\angle 2 \cong \angle 3$

Prove: $\angle 3$ is a right angle

Statements	Reasons

Given: $m\angle O = 180^\circ$; $m\angle P = m\angle S$; $\angle O \cong \angle P$

Prove: $\angle S$ is a straight angle

Statements	Reasons

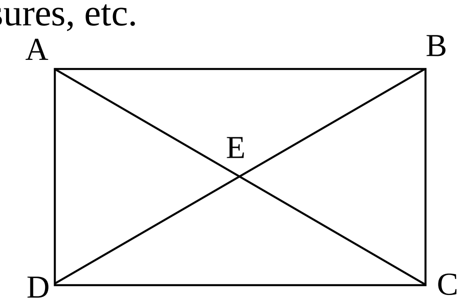
DEFINITIONS AND POSTULATES REGARDING SEGMENTS	
SEGMENT ADDITION POSTULATE	If *C* is between *A* and *B*, then AC + CB = AB
DEFINITION OF SEGMENT CONGRUENCE	If $\overline{AB} \cong \overline{CD}$, then AB = CD
DEFINITION OF A SEGMENT BISECTOR	*A geometric figure that divides a segment in to two congruent halves*
DEFINITION OF A MIDPOINT	*A point that bisects a segment*
DEFINITIONS AND POSTULATES REGARDING ANGLES	
ANGLE ADDITION POSTULATE	If *C* is on the interior of $\angle ABD$, then $m\angle ABC + m\angle CBD = m\angle ABD$
DEFINITION OF ANGLE CONGRUENCE	If $\angle A \cong \angle B$, then $m\angle A = m\angle B$
DEFINITION OF AN ANGLE BISECTOR	*A geometric figure that divides a angle in to two congruent halves*

Proofs with Pictures

It is often much easier to plan and finish a proof if there is a visual aid. Use the picture to help you plan and finish the proof. Be sure that as you write each statement, you make the picture match your proof by inserting marks, measures, etc.

Given: E is the midpoint of $\overline{AC}$ and $\overline{BD}$; $\overline{ED} \cong \overline{EC}$

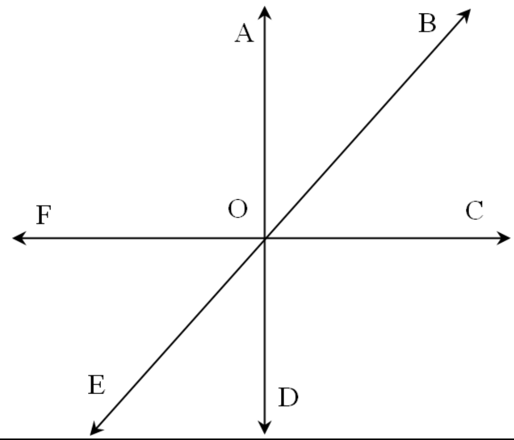
Prove: $\overline{AE} \cong \overline{BE}$



Statements	Reasons

Given: $\overrightarrow{OB}$ bisects $\angle AOC$;
$\overrightarrow{OE}$ bisects $\angle DOF$;
$\angle AOB \cong \angle DOE$

Prove: $\angle EOF \cong \angle BOC$

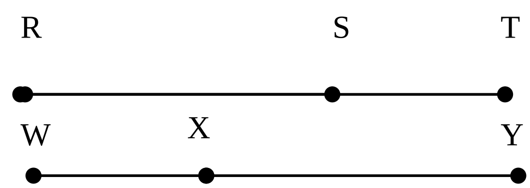


Statements	Reasons

Elementary Geometric Proofs

Segments

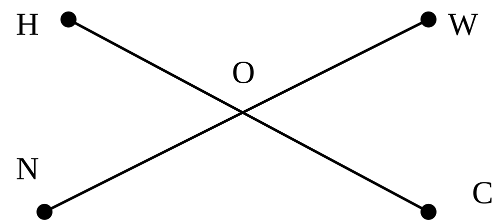
Given: $\overline{RT} \cong \overline{WY}$; $\overline{ST} \cong \overline{WX}$
Prove: $\overline{RS} \cong \overline{XY}$



Statements	Reasons

Given: O is the midpoint of $\overline{NW}$;
$\overline{NO} \cong \overline{OC}$

Prove: $\overline{OC} \cong \overline{OW}$



Statements	Reasons
1. O is the midpoint of $\overline{NW}$	1.
2. $\overline{NO} \cong \overline{OW}$	2.
3.	3. Given
4. $\overline{OC} \cong \overline{OW}$	4.

Given: $\overline{EF} \cong \overline{GH}$

Prove: $\overline{EG} \cong \overline{FH}$

Statements	Reasons
1. $\overline{EF} \cong \overline{GH}$	1.
2. EF = GH	2.
3. EF + FG = GH + FG	3.
4. EF + FG = EG; GH + FG = FH	4.
5. EG = FH	5.
6. $\overline{EG} \cong \overline{FH}$	6.

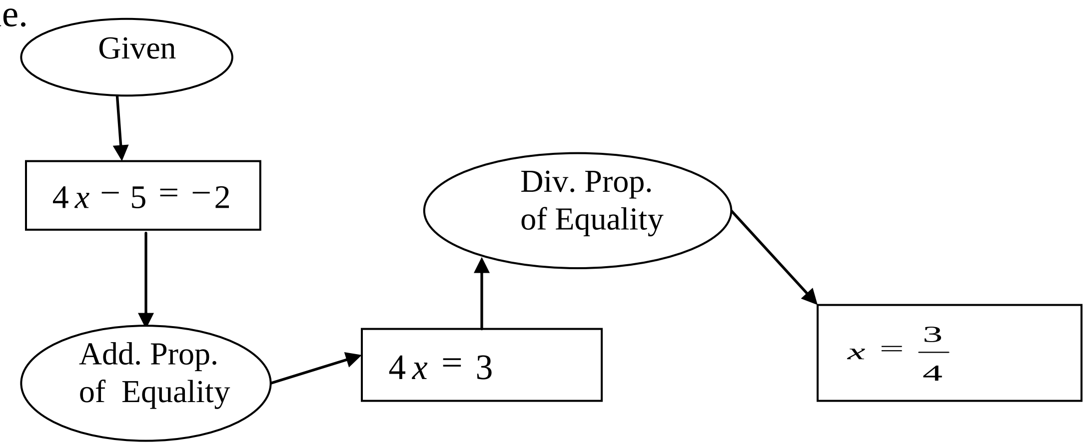
Flow Proofs

Proofs do not always come in two-column format. Sometimes they are more visual, as you will see in this example.

Flow Proof

Given: $4x - 5 = -2$

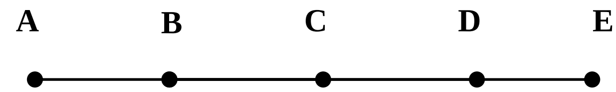
Prove: $x = \frac{3}{4}$

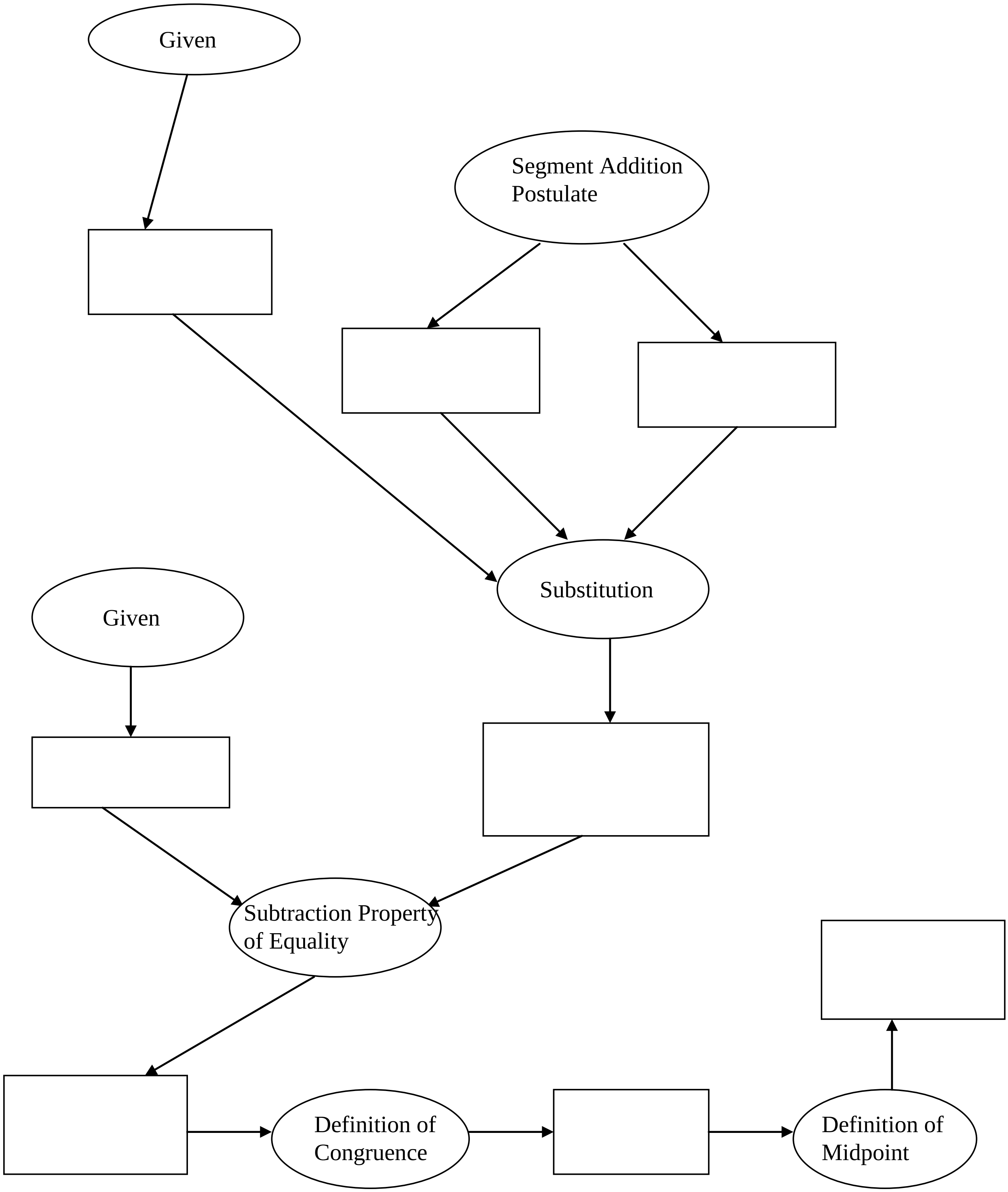


Complete the flow chart for the following proof.

Given: $AC = CE;\ AB = DE$

Prove: C is the midpoint of $\overline{BD}$





Name ______________________ Class __________ Date __________

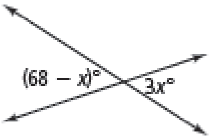
10.7 Practice

Form K

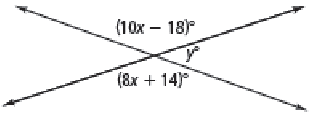
Proving Angles Congruent

Find the value of each variable.

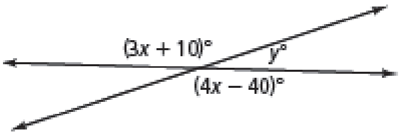
1.



2.



3.



Find the measures of the labeled angles in each exercise.

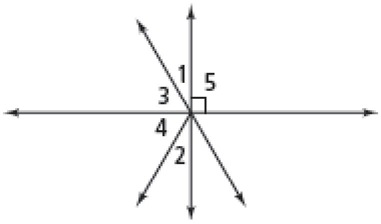
4. Exercise 1

5. Exercise 2

6. Exercise 3

Developing Proof **Complete the following proof by filling in the blanks.**

7. **Given:** $\angle 1 \cong \angle 2$, $m\angle 5 = 90^\circ$
Prove: $\angle 3 \cong \angle 4$



Statements	Reasons
1) $\angle 1 \cong \angle 2$	1) Given
2) $m\angle 1 + m\angle 3 + m\angle 5 = 180^\circ$	2) ?
3) $m\angle 1 + m\angle 3 + 90^\circ = 180^\circ$	3) ?
4) $m\angle 1 + m\angle 3 = 90^\circ$	4) ?
5) $m\angle 4 + m\angle 2 = m$_5	5) ?
6) $m\angle 4 + m\angle 2 = 90^\circ$	6) ?
7) $m\angle 4 + m\angle 1 = 90^\circ$	7) ?
8) $m\angle 4 = m\angle 3$	8) ?

8. **Reasoning** $\angle A$ and $\angle B$ are adjacent complementary angles. $\angle C$ is supplementary to the angle formed by $\angle A$ and $\angle B$. What can you conclude about $\angle C$? Explain.

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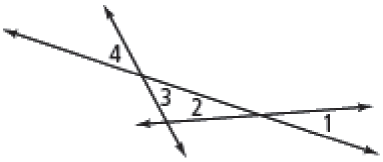
Practice (continued) *Form K*

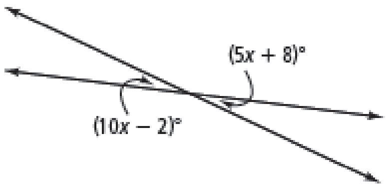
Proving Angles Congruent



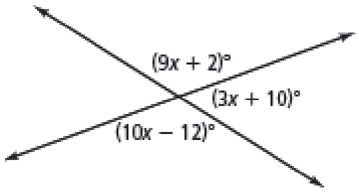
9. Developing Proof Fill in the blanks to complete the paragraph proof below.
Given: ∠1 ≅ ∠4
Prove: ∠2 ≅ ∠3
∠1 ≅ ∠4 because it is given. ∠1 ≅ ∠2 by the __?__. ∠2 ≅ ∠4 by the __?__. ∠3 ≅ ∠4 by the __?__. It follows that __?__ ≅ __?__ by the __?__ .

Algebra Find the value of each variable and the measure of each labeled angle.

10.

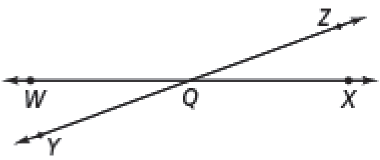


11.

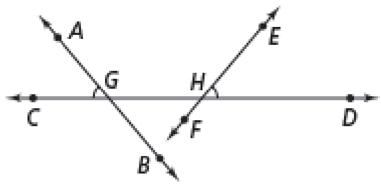


Name two pairs of congruent angles in each figure. Justify your answers.

12.



13.



Algebra Find the measure of each angle.

14. ∠*A* is three times as large as its complement, ∠*B*.

15. ∠*A* is 21 less than twice as large as its supplement, ∠*B*.

16. ∠*A* is congruent to its supplement, ∠*B*.

17. ∠*A* is 18 more than five times its complement, ∠*B*.

Name: ____ Date: ________________ Period: ________

Math 1 Unit 10 Review

1. For each statement, underline the hypothesis and circle the conclusion.

a. If I study for the test, then I will get a higher grade on the test.

b. If a figure has three sides, then the figure is a triangle.

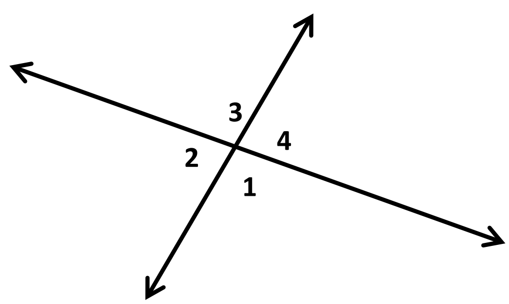
2. Complete the two-column proof:

STATEMENTS	REASONS
$5(x-2)+8=-3$	Given
5x – 10 +8 = -3	
	Combining like terms
5x = -1	
	Division Property of Equality

3. Complete the two-column proof:

Given: $\angle 1 \cong \angle 2$

Prove: $\angle 3 \cong \angle 4$



STATEMENTS	REASONS

4. $\angle M$ and $\angle N$ are vertical angles, $m\angle M = 2x + 42$ and $m\angle N = 5x - 3$. What is the measure of $\angle M$?

5. $\angle Y$ and $\angle Z$ are supplementary angles. If $m\angle Y = 3x - 7$, and $m\angle Z = 2x + 12$. Find $m\angle Y$ and $m\angle Z$.

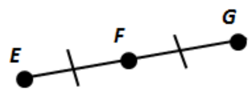
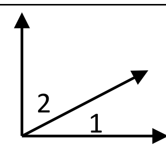
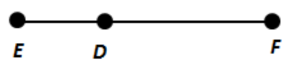
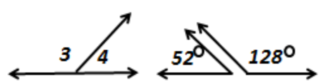
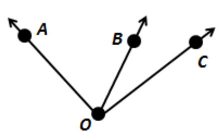
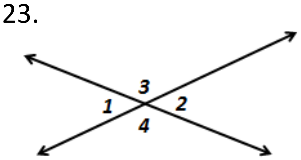
6. $\angle C$ and $\angle D$ are complementary angles. If $m\angle C = 5x - 3$, and $m\angle D = 2x + 30$. Find $m\angle C$ and $m\angle D$.

7. The measure of $\angle B$ is five times the measure of its supplement $\angle A$. What is the measure of $\angle B$?

8. Match the term with its definition:

<table>
<tr><th>TERM</th><th colspan="3">DEFINITION</th><th>ANSWER</th></tr>
<tr><td>a. Perpendicular Bisector</td><td rowspan="3">1. An if-then statement.</td><td rowspan="3">2. Exchange the hypothesis and conclusion.</td><td rowspan="3">3. Ex. An angle is a right angle if and only if it measures $90°$.</td><td>a. ________</td></tr>
<tr><td>b. Counterexample</td><td>b. ________</td></tr>
<tr><td>c. Conditional</td><td>c. ________</td></tr>
<tr><td>d. Hypothesis</td><td rowspan="3">4. The “then” part.</td><td rowspan="3">5. A line, segment or ray that is perpendicular to the segment at its midpoint.</td><td rowspan="3">6. Example that shows a statement is incorrect.</td><td>d. ________</td></tr>
<tr><td>e. Conclusion</td><td>e. ________</td></tr>
<tr><td>f. Truth Value</td><td>f. ________</td></tr>
<tr><td>g. Converse</td><td rowspan="3">7. A definition is good if it can be written as a biconditional.</td><td rowspan="3">8. The “if” part.</td><td rowspan="3">9. True or False.
One counterexample will prove a statement false.</td><td>g. ________</td></tr>
<tr><td>h. Biconditional</td><td>h. ________</td></tr>
<tr><td>i. Good Definition</td><td>i. ________</td></tr>
</table>

9. Match the property with its definition:

TERM	DEFINITION			ANSWER
j. Reflexive Property	**10.** $a = a$ $\overline{RS} \cong \overline{RS}$ $\angle T \cong \angle T$	**11.** $If\ a = b\ and\ c \neq 0,$ $then\ \frac{a}{c} = \frac{b}{c}.$	**12.** $If\ a = b, then$ $a - c = b - c.$	**j.** ________
k. Symmetric Property				**k.** ________
l. Transitive Property				**l.** ________
m. Substitution Property	**13.** $If\ a = b, then$ $a + c = b + c.$	**14.**  F is the midpoint of $\overline{EG}$ $EF = FG$	**15.** If a = b, then b = a. $If\ \overline{AB} \cong \overline{CD}, then$ $\overline{CD} \cong \overline{AB}.$ $If\ \angle F \cong \angle G, then$ $\angle G \cong \angle F.$	**m.** ________
n. Addition Property				**n.** ________
o. Subtraction Property				**o.** ________
p. Multiplication Property	**16.** $If\ a = b\ and$ $b = c\ then\ a = c$ $If\ \angle J \cong \angle K\ and$ $\angle K \cong \angle L\ then\ \angle J \cong \angle L$ $If\ \overline{PQ} \cong \overline{RS}\ and$ $\overline{RS} \cong \overline{TU}\ then$ $\overline{PQ} \cong \overline{TU}$	**17.** $then\ AB = CD$ $then\ m\angle E = m\angle F$	**18.**  Two angles whose measures have a sum of 90°.	**p.** ________
q. Division Property				**q.** ________
r. Segment Addition				**r.** ________
s. Angle Addition	19.  **ED + DF = EF**	20.  *Adjacent or Nonadjacent* Two angles whose measures have a sum of 180°	21. $If\ a = b, then$ $a \cdot c = b \cdot c.$	**s.** ________
t. $If\ \overline{AB} \cong \overline{CD}$ $If\ \angle E \cong \angle F$				**t.** ________
u. Midpoint				**u.** ________
v. Supplementary Angles	22.  $m\angle AOB + m\angle BOC = m\angle AOC$	23.  Two angles whose sides are opposite rays $Examples{:}\ \angle 1\ and\ \angle 2,\quad \angle 3\ and\ \angle 4$	24. $If\ a = b,$ $the\ b\ can\ replace$ $a\ in\ any\ expression$	**v.** ________
w. Complementary Angles				**w.** ________
x. Vertical Angles				**x.** ________

10. State whether the statement is TRUE or FALSE. If false, provide a counter example.

a. If the animal is a dog, it is a Golden Retriever.

b. All segment bisectors are perpendicular bisectors.

c. If there are three congruent sides, the triangle is equilateral.

d. If $\angle A$ and $\angle B$ are complementary, then $\angle A = \angle B$

11. Using the figure below, find *x*, $m\angle LMD$, and $m\angle LMH$