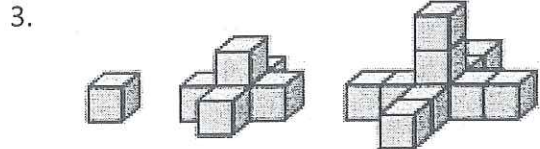
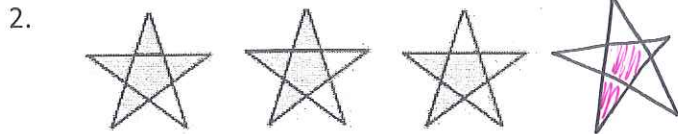




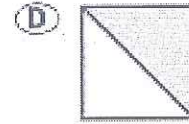
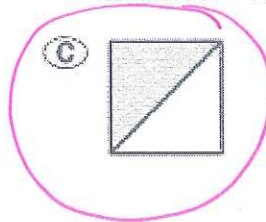
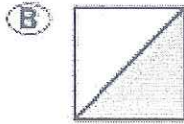
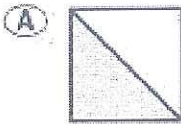
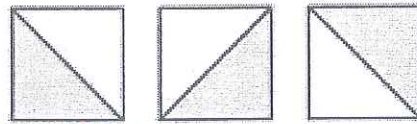
Vocabulary: 1. Write a definition of *conjecture* in your own words.

Pattern Recognition: Sketch the next figure in the pattern.



4 blocks up & out
add a block in every direction

4. **★ MULTIPLE CHOICE** What is the next figure in the pattern?



Describing Number Patterns: Write the next number in the pattern. Describe the pattern in the numbers.

5. 1, 5, 9, 13, 17, 21, 25
+4 +4 +4
add 4 each time

6. 10, 5, 2.5, 1.25, ...
÷2 ÷2 ÷2
0.625, 0.3125, 0.15625
divide by 2

7. 4, 3, 1, -2, -6, -11, -17
-1 -2 -3 -4 -5 -6
subtract 1 more than previously

Make a conjecture:

8. Use these sums of odd integers: $3 + 7 = 10$, $1 + 7 = 8$, $17 + 21 = 38$
Conjecture The sum of any two odd integers is ? even

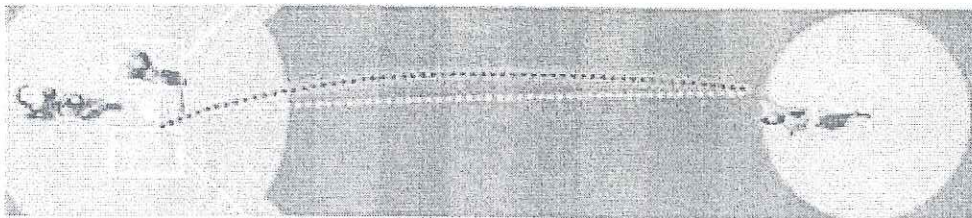
Find a counterexample:

9. If the multiply product of two numbers is positive, then the two numbers must both be positive.

$$-5 \cdot -4 = 20$$

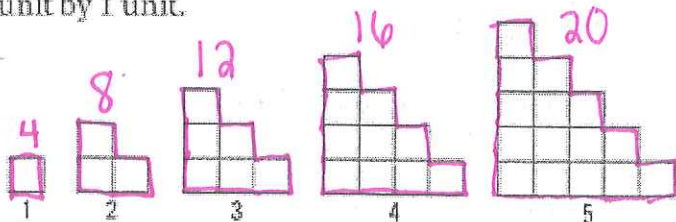
Applied Problems:

10. **BASEBALL** You are watching a pitcher who throws two types of pitches, a fastball (F, in white below) and a curveball (C, in red below). You notice that the order of pitches was F, C, F, F, C, C, F, F, F. Assuming that this pattern continues, predict the next five pitches.



C, C, F, F

11. **VISUAL REASONING** Use the pattern below. Each figure is made of squares that are 1 unit by 1 unit.



step#	1	2	3	4	5
distance	4	8	12	16	20

- a. Find the distance around each figure. Organize your results in a table.
b. Use your table to *describe* a pattern in the distances. *adds 4 each time*
c. Predict the distance around the 20th figure in this pattern.

multiply the step # by 4

$$20 \times 4 = 80 \text{ units}$$

step #



LAW OF DETACHMENT Make a valid conclusion in the situation.

1. If the measure of an angle is 90° , then it is a right angle. The measure of $\angle A$ is 90° .

So... $\angle A$ is a right angle.

2. If $x > 12$, then $-x < -12$. The value of x is 15.

So... $-15 < -12$

3. If a book is a biography, then it is nonfiction. You are reading a biography.

So... the book is nonfiction

LAW OF SYLLOGISM Write the statement that follows from the pair of statements that are given.

4. If $y > 0$, ^{conc} then $2y > 0$. ^{hyp} If $2y > 0$, then $2y - 5 \neq -5$.

If $y > 0$, then $2y - 5 \neq -5$

5. If you play the clarinet, ^{conc} then you play a woodwind instrument. If you play a ^{hyp} woodwind instrument, then you are a musician.

If you play the clarinet, then you are a musician

What conclusion can you make?

6. **CAR COSTS** If you save \$2000, then you can buy a car. You have saved \$1200.

You can't buy a car.





What conclusion can you make?

7. **PROFIT** ^{conc} The bakery makes a profit if its revenue is greater than its costs. You will get a raise ^{hyp} if the bakery makes a profit.

If its revenue is greater than its costs, you will get a raise.

8.

★ **EXTENDED RESPONSE** Geologists use the Mohs scale to determine a mineral's hardness. Using the scale, a mineral with a higher rating will leave a scratch on a mineral with a lower rating. Geologists use scratch tests to help identify an unknown mineral.

Mineral				
	Talc	Gypsum	Calcite	Fluorite
Mohs rating	1	2	3	4

a) If gypsum is scratched against calcite, then gypsum will have a scratch.

- a. Use the table to write three if-then statements such as "If talc is scratched against gypsum, then a scratch mark is left on the talc."
b. You must identify four minerals labeled A, B, C, and D. You know that the minerals are the ones shown in the table. The results of your scratch tests are shown below. What can you conclude? Explain your reasoning.

Mineral A is scratched by Mineral B.

Mineral C is scratched by all three of the other minerals.

Min. A could be talc, gypsum or calcite
min B could be calcite or fluorite
TALC-weak

- c. What additional test(s) can you use to identify *all* the minerals in part (b)?

REASONING Decide whether *inductive* or *deductive* reasoning is used to reach the conclusion. Explain.

9. The rule at your school is that you must attend all of your classes in order to participate in sports after school. You played in a soccer game after school on Monday. Therefore, you went to all of your classes on Monday.

Deductive - fact

10. For the past 5 years, your neighbor goes on vacation every July 4th and asks you to feed her hamster. You conclude that you will be asked to feed her hamster on the next July 4th.

Inductive - pattern, but not fact

1. Write a reason for each step.

$$3x - 12 = 7x + 8$$

$$-4x - 12 = 8 \quad \text{subtract}$$

$$-4x = 20 \quad \text{Add}$$

$$x = -5 \quad \text{divide}$$

Solve the equation. Write a reason for each step.

2. $5x - 10 = -40$

$$\begin{array}{r} +10 \quad +10 \\ \hline 5x = -30 \end{array} \quad \begin{array}{l} \text{Add} \\ \text{divide} \end{array}$$

$$x = -6$$

3. $4x + 9 = 16 - 3x$

$$\begin{array}{r} +3x \quad +3x \\ \hline 7x + 9 = 16 \end{array} \quad \text{Add}$$

$$\begin{array}{r} -9 \quad -9 \\ \hline 7x = 7 \end{array} \quad \text{Subtract}$$

$$\begin{array}{r} \frac{7x}{7} = \frac{7}{7} \\ \hline \end{array} \quad \text{divide}$$

$$x = 1$$

4. $3(2x + 11) = 9$

$$\begin{array}{r} 6x + 33 = 9 \quad \text{distribute} \\ -33 \quad -33 \quad \text{subtract} \\ \hline 6x = -24 \end{array}$$

$$\begin{array}{r} \frac{6x}{6} = \frac{-24}{6} \\ \hline \end{array} \quad \text{divide}$$

$$x = -4$$

5. $4(5x - 9) = -2(x + 7)$

$$\begin{array}{r} 20x - 36 = -2x - 14 \quad \text{distr.} \\ +2x \quad +2x \quad \text{add} \\ \hline 22x - 36 = -14 \end{array}$$

$$\begin{array}{r} +36 \quad +36 \quad \text{add} \\ \hline 22x = 22 \end{array}$$

$$\begin{array}{r} \frac{22x}{22} = \frac{22}{22} \\ \hline \end{array} \quad \text{divide}$$

$$x = 1$$

6. Solve the equation for y . Write a reason for each step.

$$\begin{array}{r}
 5x + y = 18 \\
 -5x \quad -5x \quad \text{subtract} \\
 \hline
 y = 18 - 5x
 \end{array}$$

7. Use the property to complete the statement.

Substitution Property of Equality: If $AB = 20$, then $AB + CD = 20 + CD$.

* Symmetric Property of Equality: If $m\angle 1 = m\angle 2$, then $m\angle 2 = m\angle 1$.

Addition Property of Equality: If $AB = CD$, then $AB + EF = CD + EF$.

Distributive Property: If $5(x + 8) = 2$, then $5x + 40 = 2$.

* Transitive Property of Equality: If $m\angle 1 = m\angle 2$ and $m\angle 2 = m\angle 3$, then $m\angle 1 = m\angle 3$.

8.

ERROR ANALYSIS Describe and correct the error in solving the equation for x .

$7x = x + 24$	Given	
$-x$ $-x$ $6x = 24$	Addition Property of Equality	✗
$x = 3$	Division Property of Equality	

$$\begin{array}{r}
 6x = 24 \quad \text{subtract} \\
 \underline{6} \quad \underline{6} \quad \text{divide} \\
 x = 4
 \end{array}$$

$$\boxed{x = 4}$$

2.5 Reflexive Symmetric Transitive Practice

Name: _____

Match the statement with the property it illustrates.

- | | |
|---|--------------------------------------|
| 1. $m\angle DEF = m\angle DEF$ B | A. Symmetric Property of Equality |
| 2. If $\overline{PQ} \cong \overline{ST}$, then $\overline{ST} \cong \overline{PQ}$. E | B. Reflexive Property of Equality |
| 3. $\overline{XY} \cong \overline{XY}$ D | C. Transitive Property of Equality |
| 4. If $\angle J \cong \angle K$ and $\angle K \cong \angle L$, then $\angle J \cong \angle L$. F | D. Reflexive Property of Congruence |
| 5. If $PQ = QR$ and $QR = RS$, then $PQ = RS$. C | E. Symmetric Property of Congruence |
| 6. If $m\angle X = m\angle Y$, then $m\angle Y = m\angle X$. A | F. Transitive Property of Congruence |

Name the property that the statement illustrates.

7. $\angle ABC \cong \angle ABC$ Ref. prop of \cong
8. If $m\angle B = m\angle D$ and $m\angle D = m\angle F$, then $m\angle B = m\angle F$. Transitive
9. If $\overline{GH} \cong \overline{JK}$, then $\overline{JK} \cong \overline{GH}$. Symmetric

Completing Statements Use the property to complete the statement.

10. Reflexive Property of Equality: $JK = \underline{?} JK$
11. Symmetric Property of Equality: If $m\angle P = m\angle Q$, then $\underline{?} = \underline{?}$. $m\angle Q \quad m\angle P$
12. Transitive Property of Equality: If $AB = BC$ and $BC = CD$, then $\underline{?} = \underline{?}$.
 $\underline{AB} = \underline{CD}$
13. Reflexive Property of Congruence: $\underline{?} \cong \angle GHJ$
 $\angle GHJ$

2.5 Reflexive Symmetric Transitive Practice

$\angle ABC$ $\angle XYZ$

14. Symmetric Property of Congruence: If $\underline{\quad ? \quad} \cong \underline{\quad ? \quad}$, then $\angle XYZ \cong \angle ABC$.

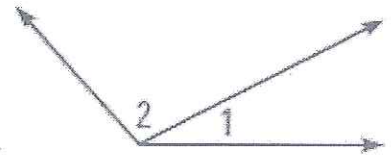
15. Transitive Property of Congruence: If $\overline{GH} \cong \overline{IJ}$ and $\overline{IJ} \cong \overline{PQ}$, then $\overline{GH} \cong \overline{PQ}$.

19. Using Properties In the diagram, $m\angle 1 + m\angle 2 = 132^\circ$, and $m\angle 2 = 105^\circ$. Complete the argument to show that $m\angle 1 = 27^\circ$.

1) $m\angle 1 + m\angle 2 = 132^\circ$ Given
 $m\angle 2 = 105^\circ$ Given

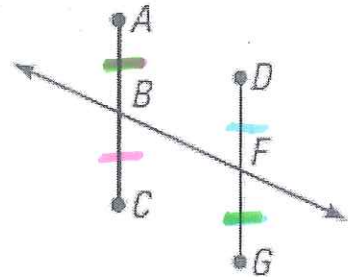
3) $m\angle 1 + 105^\circ = 132^\circ$ Substitution
 ? Property of Equality

4) $m\angle 1 = 27^\circ$ Subtraction
 ? Property of Equality



20. Using Properties of Congruence In the diagram, $\overline{AB} \cong \overline{FG}$, and \overline{BF} bisects \overline{AC} and \overline{DG} . Complete the argument to show that $\overline{BC} \cong \overline{DF}$.

1) $\overline{BC} \cong \overline{AB}$ Definition of bisect
 ?
 2) $\overline{AB} \cong \overline{FG}$? Given
 3) $\overline{FG} \cong \overline{DF}$ Definition of bisect
 4) $\overline{BC} \cong \overline{DF}$ Transitive
 ? Property of Congruence

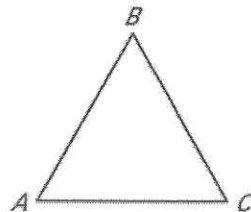




In Exercises 1-3, complete the proof.

1. GIVEN: $m\angle A = m\angle B, m\angle B = m\angle C$

PROVE: $\angle A \cong \angle C$



Statements

Reasons

1. $m\angle A = m\angle B, m\angle B = m\angle C$

1. Given

2. $m\angle A = m\angle C$

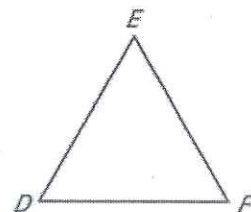
2. Transitive

3. ? $\angle A \cong \angle C$

3. If =, then \cong

2. GIVEN: $DE = EF, EF = DF$

PROVE: $\overline{DF} \cong \overline{DE}$



Statements

Reasons

1. $DE = EF, EF = DF$

1. Given

2. ? $DE = DF$

2. Transitive

3. $DF = DE$

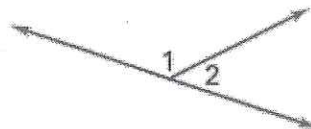
3. Symmetric

4. ? $\overline{DF} \cong \overline{DE}$

4. If =, then \cong

3. GIVEN: $\angle 1$ and $\angle 2$ are a linear pair.

PROVE: $m\angle 1 = 180^\circ - m\angle 2$



Statements

Reasons

1. ? $\angle 1$ & $\angle 2$ are a linear pair

1. Given

2. ? $\angle 1$ & $\angle 2$ are supp.

2. if Linear pair, then supp

3. $m\angle 1 + m\angle 2 = 180^\circ$

3. If supp., then add to 180.

4. ? $m\angle 1 = 180^\circ - m\angle 2$

4. if Subst. on L, then subst on R

Use the property to complete the statement.

4. Reflexive Property of Congruence: $\angle 4 \cong \angle 4$

5. Symmetric Property of Congruence: If $\frac{?}{DX} \cong \frac{?}{CD}$, then $\overline{CD} \cong \overline{DX}$.

In Exercises 6-9, name the property illustrated by the statement.

6. If $\angle 1 \cong \angle 2$ and $\angle 2 \cong \angle 4$, then $\angle 1 \cong \angle 4$.

Transitive

7. $\overline{XY} \cong \overline{XY}$

Reflexive

8. If $\angle CDE \cong \angle RST$, then $\angle RST \cong \angle CDE$.

Symmetric

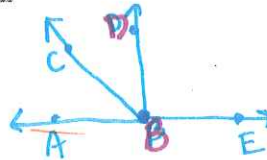
9. If $\overline{AB} \cong \overline{BC}$, then $\overline{BC} \cong \overline{AB}$.

symmetric

10. Sketch a diagram that represents the following information.

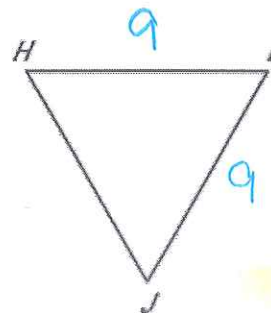
$\angle ABC$ and $\angle CBD$ are adjacent angles.

$\angle ABD$ and $\angle DBE$ are a linear pair.



1. GIVEN: $HI = 9$, $IJ = 9$, $\overline{IJ} \cong \overline{JH}$

PROVE: $\overline{HI} \cong \overline{JH}$

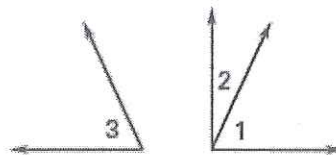


Statements	Reasons
1. $HI = 9$ ✓	1. ? Given
2. $IJ = 9$ ✓	2. ? Given
3. $HI = IJ$	3. ? Transitive
4. ? $\overline{HI} \cong \overline{IJ}$	4. Definition of congruent segments If = then \cong
5. $\overline{IJ} \cong \overline{JH}$	5. Given
6. $\overline{HI} \cong \overline{JH}$	6. ? Transitive

2. GIVEN: $\angle 3$ and $\angle 2$ are complementary.

$$m\angle 1 + m\angle 2 = 90^\circ$$

PROVE: $\angle 3 \cong \angle 1$



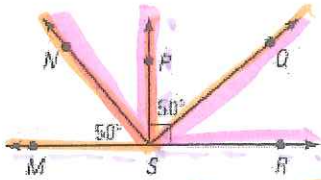
Statements	Reasons
1. $\angle 3$ and $\angle 2$ are complementary.	1. ? Given
2. $m\angle 1 + m\angle 2 = 90^\circ$	2. ? Given
3. $m\angle 3 + m\angle 2 = 90^\circ$	3. ? If comp, then add to 90°
4. $m\angle 1 + m\angle 2 = m\angle 3 + m\angle 2$	4. ? Transitive
5. $m\angle 1 = m\angle 3$	5. ? If subt L, then subt. right
6. $\angle 1 \cong \angle 3$	6. ? If =, then \cong

7. $\angle 3 \cong \angle 1$

7. Symmetric

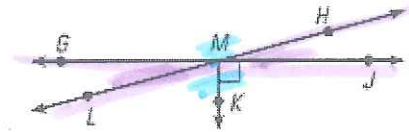
IDENTIFY ANGLES Identify the pair(s) of congruent angles in the figures below. Explain how you know they are congruent.

1.



$\angle NSM \cong \angle QSP$ - both 50°
 $\angle MSP \cong \angle PSR$ - both 90°
 $\angle NSP \cong \angle RSQ$ - both 40°

2.

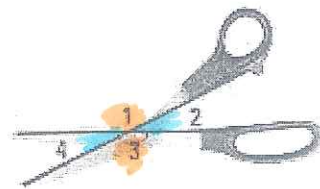


$\angle GML \cong \angle H MJ$ - vert. \angle s
 $\angle GMH \cong \angle LKJ$ - vert. \angle s
 $\angle JMK \cong \angle G MK$ - 90°

#3-4: Use the diagram at the right to find the measures of the other angles.

3. If $m\angle 1 = 145^\circ$, find $m\angle 2$, $m\angle 3$, and $m\angle 4$.

$m\angle 3 = 145^\circ$
 $m\angle 2 = 35^\circ$
 $m\angle 4 = 35^\circ$
 180-145

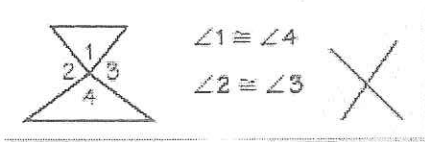


4. If $m\angle 4 = 37^\circ$, find $m\angle 1$, $m\angle 2$, and $m\angle 3$.

$m\angle 2 = 37^\circ$
 $m\angle 1 = 143^\circ$
 $m\angle 3 = 143^\circ$
 180-37

5. **ERROR ANALYSIS** Describe the error in stating that $\angle 1 \cong \angle 4$ and $\angle 2 \cong \angle 3$.

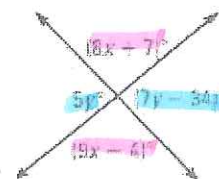
NOT vert. \angle s **X**



6. Find the values of x and y .

$$\begin{array}{r} 8x + 7 = 9x - 4 \\ -8x \quad -8x \\ \hline 7 = x - 4 \\ +4 \quad +4 \\ \hline 11 = x \end{array}$$

$$\begin{array}{r} 5y = 7y - 34 \\ -7y \quad -7y \\ \hline -2y = -34 \\ \frac{-2y}{-2} = \frac{-34}{-2} \\ \hline y = 17 \end{array}$$



8. Complete the statement given that $m\angle FHE = m\angle BHG = m\angle AHF = 90^\circ$

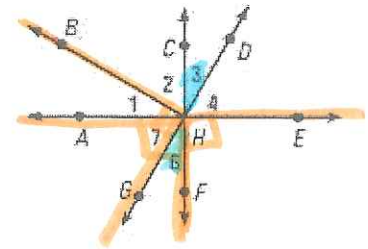
If $m\angle 3 = 30^\circ$, then $m\angle 6 = \underline{30^\circ}$

If $m\angle BHF = 115^\circ$, then $m\angle 3 = \underline{25^\circ}$ $115 - 90 = 25$

If $m\angle 6 = 27^\circ$, then $m\angle 1 = \underline{27^\circ}$, both comp to $\angle 7$

If $m\angle DHF = 133^\circ$, then $m\angle CHG = \underline{?}$

If $m\angle 3 = 32^\circ$, then $m\angle 2 = \underline{?}$



9. ANALYZING STATEMENTS Two lines that are not perpendicular intersect such that $\angle 1$ and $\angle 2$ are a linear pair, $\angle 1$ and $\angle 4$ are a linear pair, and $\angle 1$ and $\angle 3$ are vertical angles. Tell whether the statement is true. not 90° angles

HINT: DRAW A PICTURE

a. $\angle 1 \cong \angle 2$ **NO**

b. $\angle 1 \cong \angle 3$ **Yes - vertical**

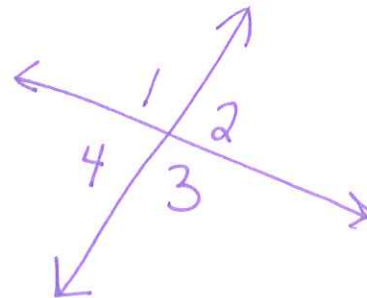
c. $\angle 1 \cong \angle 4$ **NO**

d. $\angle 3 \cong \angle 2$ **NO**

e. $\angle 2 \cong \angle 4$ **Yes - vertical**

f. $m\angle 3 + m\angle 4 = 180^\circ$

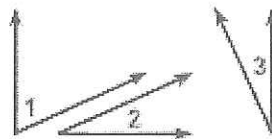
Yes - linear pair



10. Complete the proof.

GIVEN $\angle 1$ and $\angle 2$ are complements.
 $\angle 1$ and $\angle 3$ are complements.

PROVE $\angle 2 \cong \angle 3$



STATEMENTS

REASONS

1. $\angle 1$ and $\angle 2$ are complements.
 $\angle 1$ and $\angle 3$ are complements.

1. $\underline{?}$ **Given**

2. $m\angle 1 + m\angle 2 = 90^\circ$
 $m\angle 1 + m\angle 3 = 90^\circ$

2. $\underline{?}$ **If comp., then add to 90°**

3. $\underline{?}$ $m\angle 1 + m\angle 2 = m\angle 1 + m\angle 3$

3. Transitive Property of Equality

4. $\underline{?}$ $m\angle 2 = m\angle 3$

4. Subtraction Property of Equality

5. $\angle 2 \cong \angle 3$

5. $\underline{?}$