Unit 01 – Intro to Geometry

Key Terms:

|		
Point	Congruent Segments	Segment Bisector
Segment	Congruent Angles	Segment Trisector
Ray	Tick marks	Complementary Angles
Line	Union	Supplementary Angles
Plane	Intersection	Vertical Angles
Collinear	Midpoint	Linear Pair
Coplanar		

Important Concepts/Standards (I can...):
- I can label points, segments, rays, lines, and planes.
- I can find missing lengths using segment addition.
- I can find missing angles using angle addition.
- I can identify the union and intersection of segments, rays, and lines.


Unit 01 (Intro to Geometry) – Review Problems

Use the diagram.

1. Give another name for plane M. PLANE XNZ (NOT XYZ)
2. Name a line in the plane. $\overleftrightarrow{XZ}$
3. Name a line intersecting the plane. LINE h
4. Name two rays. $\overrightarrow{YP}$ AND $\overrightarrow{YX}$
5. Name a pair of opposite rays. $\overrightarrow{YX}$ AND $\overrightarrow{YZ}$
6. Name a point not in plane M. P (NOT h)
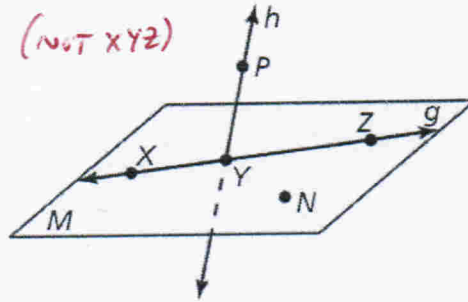
7.) Point C is between points B and D on $\overline{BD}$. You are given $BC = 12x - 6$, $BD = 24$, and $CD = 8x$.

   a. Draw a diagram that illustrates the information above.

   $12x-6$ $8x$

   B———————C———————D

   24
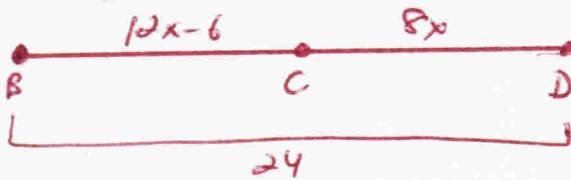
   b. Write and solve an equation to find the value of x. ~~Hint: You will need to factor!~~

   $$12x - 6 + 8x = 24$$
   $$20x = 30$$
   $$\boxed{x = 1.5}$$

   c. Find the lengths of $\overline{BC}$ and $\overline{CD}$.

   $\overline{BC} = 12(1.5) - 6$ $\overline{CD} = 8(1.5)$
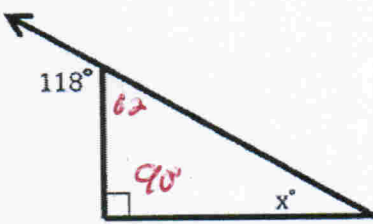 $\overline{BC} = 12$ $\overline{CD} = 12$

   d. Is C the midpoint of $\overline{BD}$? Briefly explain your reasoning.

   YES. $\overline{BC} \cong \overline{CD}$.

Use the exterior angle theorem to find the value of x.

8.)

118° 62 90° x°

METHOD 1
$180 - 118 = 62°$
$x = 180 - 62 - 90$
$\boxed{x = 28}$

METHOD 2
$x + 90 = 118$
$\boxed{x = 28}$

9.)

2x° 46° 68° (3x – 1)° 66° 114° (137 – x)°
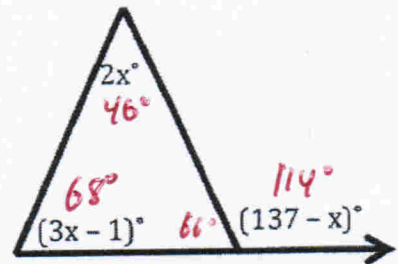
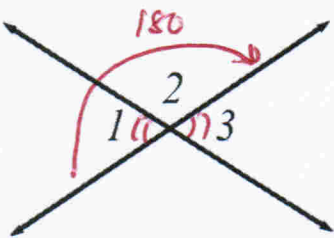$137 - x = 2x + 3x - 1$
$137 - x = 5x - 1$
$6x = 138$
$\boxed{x = 23}$

CHECK
$2(23) = 46$
$3(23) - 1 = 68$
$137 - 23 = 114$
$66 + 68 + 46 = 180$

10.) If $m\angle 1 = (2x + 13)°$ and $m\angle 2 = (x^2 - 1)°$, find $m\angle 3$.

180 2 1 3
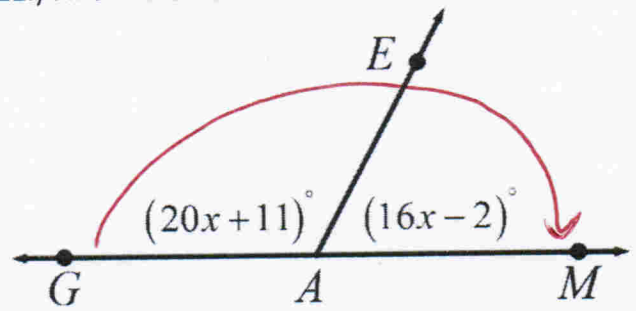
$2x + 13 + x^2 - 1 = 180$
$x^2 + 2x + 12 = 180$
$x^2 + 2x - 168 = 0$
$(x + 14)(x - 12) = 0$
$x = -14, 12$

$X \neq -14$
$(2 \cdot -14 + 13 = -15°)$
$x = 12$
$m\angle 1 = 2(12) + 13$
$m\angle 1 = m\angle 3 = \boxed{37°}$

11.) Find $m\angle GAE$.

E $(20x + 11)°$ $(16x - 2)°$ G A M

$20x + 11 + 16x - 2 = 180$
$36x + 9 = 180$
$36x = 171$
$\underline{x = 4.75}$
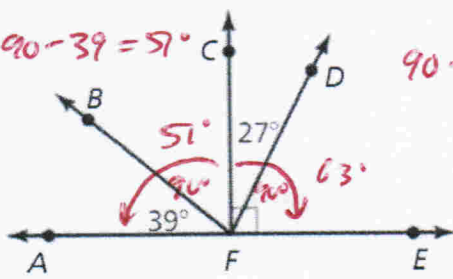
$m\angle GAE = 20(4.75) + 11$
$m\angle GAE = \boxed{106°}$

12.) In the diagram, find $m\angle DFE$, $m\angle BFC$, and $m\angle BFE$.
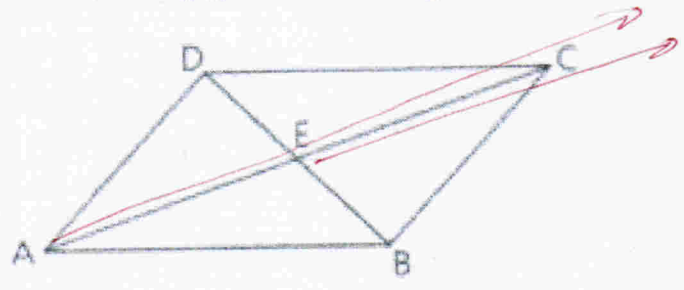

$90 - 39 = 51°$ C B D 51° 27° 90° 90° 63° 39° A F E

$90 - 27 = 63°$

$m\angle DFE = 63°$
$m\angle BFC = 51°$
$m\angle BFE = 141° (51 + 90)$

13.) Determine the union (∪) or intersection (∩) of the following statements.

a $\overline{AB} \cap \overline{BC} = \underline{B}$

b $\overrightarrow{EC} \cup \overrightarrow{EA} = \underline{\overleftrightarrow{AC}}$

c $\overleftrightarrow{AC} \cap \overleftrightarrow{DB} = \underline{E}$

d $\overline{DC} \cap \overline{AB} = \underline{\emptyset}$

e $\overrightarrow{AC} \cap \overrightarrow{EC} = \underline{\overrightarrow{EC}}$

D C E A B

Unit 02 – Parallel Lines

| Key Terms:	Important Concepts/Standards (I can...):
Parallel Lines Transversal Perpendicular Skew Lines Straight Angles Right Angles Alternate Interior Angles Alternate Exterior Angles Corresponding Angles Same Side Interior Angles Same Side Exterior Angles	• I can identify and label parallel lines and planes. • I can identify skew lines from a diagram. • I can define, recognize from a diagram, and write the symbols for parallel and perpendicular. • I can name lines associated with parallel lines, including AIA, AEA, Corresponding, SSI, and SSE. • I can find the measures of angles associated with parallel lines using congruent and supplementary relationships. • I can find the measures of missing angles using the triangle sum and exterior angle theorems.

Unit 02 (Parallel Lines) – Review Problems

14.) List **one pair** of alternate interior angles. $\angle 3$ AND $\angle 6$ or $\angle 4$ AND $\angle 5$

15.) What name do we give the angle pair of $\angle 2$ and $\angle 8$? SSE

16.) If $a \parallel b$ and $m\angle 5 = 121.7°$, what is $m\angle 2$? $180 - 121.7 = 58.3°$

17.) If $a \parallel b$, are $\angle 4$ and $\angle 6$ congruent or supplementary? Briefly explain.

SUPPLEMENTARY. SSI

18.) Find the value of **x** in the Crook problem shown.
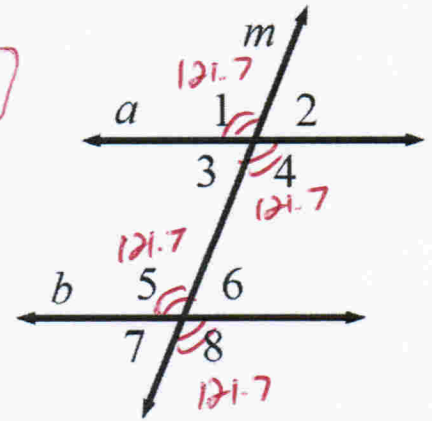
$x = 115$
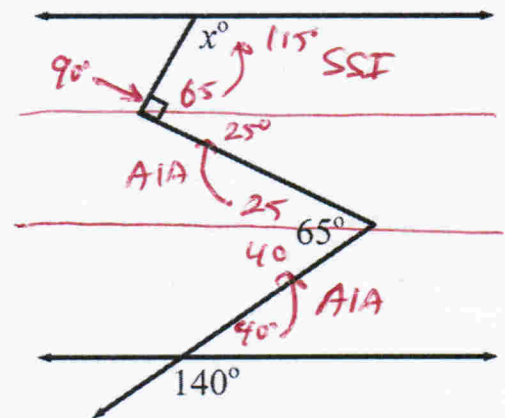
19.) Is $c \parallel d$? Show your work and briefly explain your answer.
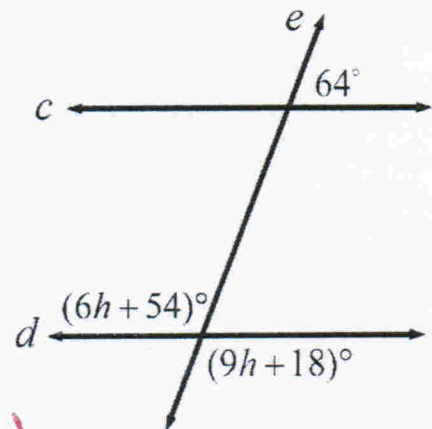
START WITH VERTICAL ANGLES $\cong$ (ALWAYS!!)

$9h + 18 = 6h + 54$

$3h = 36$

$h = 12$

$6(12) + 54 = 126°$
$9(12) + 18 = 126°$ $\cong$

$64 + 126 = 190°$

$c \parallel d$ (NOT PARALLEL)

SSE NOT SUPP (180°)

Unit 03 – Transformations

Key Terms:		Important Concepts/Standards (I can…):
Transformation	Reflection	• I can identify the 3 rigid motion transformations.
Preimage	Line of Symmetry	• I can determine preimage and image of a point under a transformation given a graph or coordinates.
Image	Rotation	• I can translate a point given words, a rule, or a vector.
Translation	Rotation Symmetry	• I can graph identify and draw the lines representing the x-axis, y-axis, $y = x$, and $y = -x$.
Translation Rule	Angle or Rotation	
Vector Form	Clockwise	• I can reflect a point or figure over a line.
Composition	Counterclockwise	• I can rotate a figure 90^0, $180°$, or $270°$ both clockwise and counterclockwise.
Prime Notation		• I can perform a composition transformation (up to 3) using translations, reflections, and rotations.

20.) For the transformation shown to the right; (USE $A \rightarrow A'$)
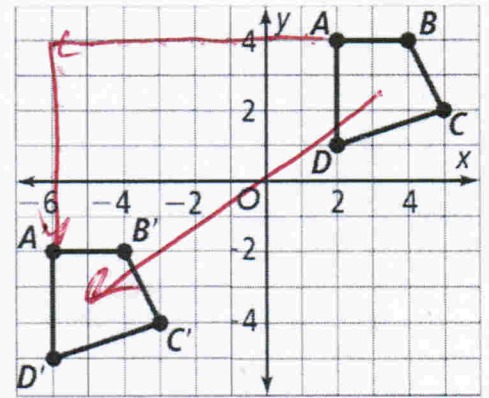
a.) Describe the translation in words.

LEFT 8, DOWN 6

b.) Write a rule describing the translation.

$(x, y) \rightarrow (x - 8, y - 6)$

c.) Write the component form of the vector for this translation.

$\langle -8, -6 \rangle$

$(x - 5, y + 7)$

Use the translation rule $(x, y) \rightarrow (x - 8, y + 5)$ **to answer the questions below.**

21.) Determine the coordinates of B if $B'(0, -10)$.

$B(5, -17) \leftarrow B'(0, -10)$
BACKWARDS

22.) Determine the coordinates of C' if $C(-1, -2)$.

$C(-1, -2) \rightarrow C'(-6, 5)$
FORWARDS

23.) **Composition Transformation.** A segment with endpoints at $J(2,4)$ and $K(-1,1)$ undergoes **three consecutive transformations**. List the coordinates after each transformation. Use the coordinate plane if you wish, but you are not required to graph anything.

- Rotated 180° around the origin $(-x, -y)$
- Translated under the rule $(x, y) \rightarrow (x + 4, y - 2)$
- Reflected over the line y =-x $(-y, -x)$
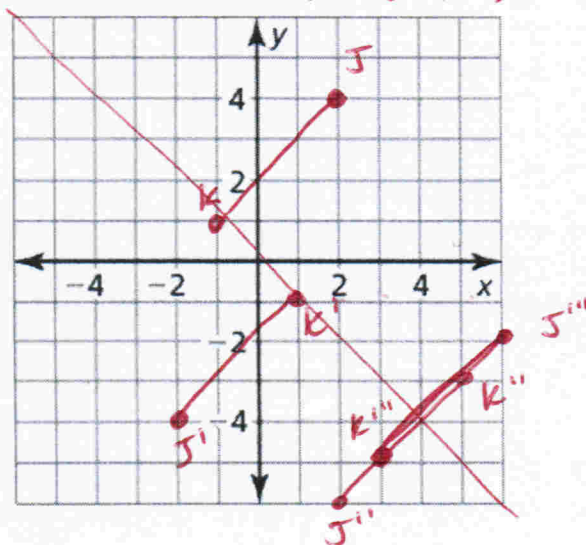
$J'(-2, -4)$
$K'(1, -1)$ } $(-x, -y)$

$J''(2, -6)$
$K''(5, -3)$ } $(x+4, y-2)$ RIGHT DOWN

$J'''(6, -2)$
$K'''(3, -5)$ } $(-y, -x)$

Unit 04 – Congruent Polygons

| Key Terms:	Important Concepts/Standards (I can…):
Congruent Triangles Congruent Figures Corresponding Parts Definition Theorem Reflexive Property Triangle Congruency Theorems	• I can identify and label parallel lines and planes. • I can identify skew lines from a diagram. • I can name lines associated with parallel lines, including AIA, AEA, Corresponding, SSI, and SSE. • I can find the measures of angles associated with parallel lines using congruent and supplementary relationships. • I can find the measures of missing angles using the triangle sum and exterior angle theorems.

Decide whether the triangles can be proven congruent by the given triangle congruence theorem. If not, state what information is needed.

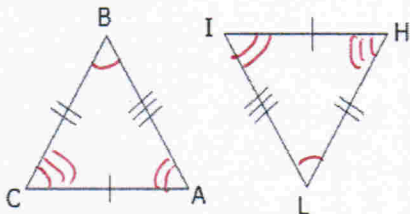24.) $\triangle IJH \cong \triangle KHJ$ by SSS
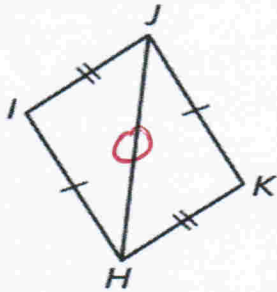
NO. NEED
$JH \cong JH$
(REFLEXIVE PROPERTY)

25.) $\triangle TNS \cong \triangle UHS$ by ASA
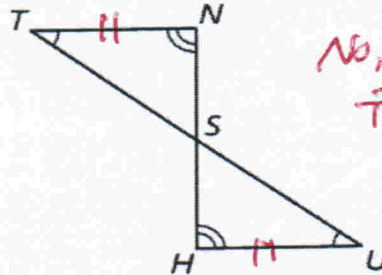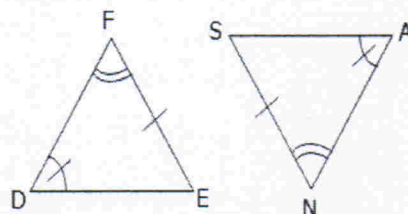
NO, NEED
$TN \cong HU$

For each problem, give the correct naming order of the congruent triangles. Write that name in order on the lines for the problem number (see box at bottom). Also, indicate which postulate or theorem is being used.
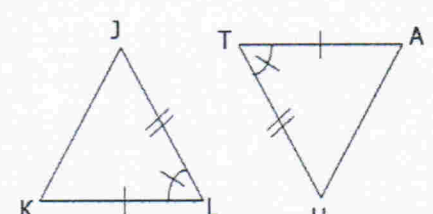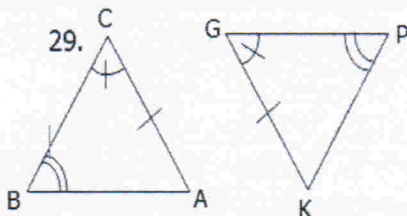
26.

$\triangle ABC \cong \triangle$ __ILH__ by __SSS__
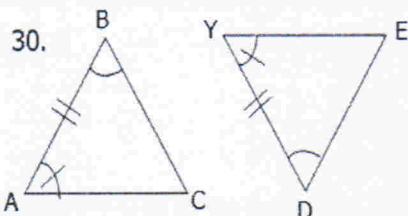
27.

$\triangle DEF \cong \triangle$ __ASN__ by __AAS__

28.

$\triangle JKL \cong \triangle$ __HAT__ by __SAS__

29.

$\triangle ABC \cong \triangle$ __KPG__ by __AAS__
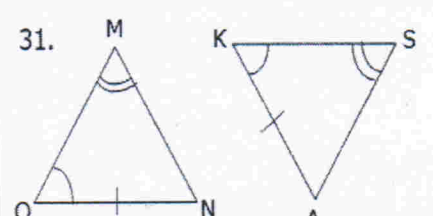
30.

$\triangle ABC \cong \triangle$ __YDE__ by __ASA__

31.

$\triangle MNO \cong \triangle$ __SAK__ by __AAS__