Geometry Semester 1 Review   Name:

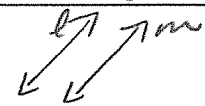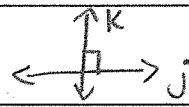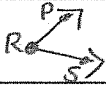1. For each of the geometric statements below, write in words what the statement is representing and then draw a picture of the geometric statement.

| Geometric Statement	What is this saying?	Draw a picture
$\overrightarrow{PQ}$	Ray PQ	
$\overleftrightarrow{AB}$	Line AB	
$l \parallel m$	line l is parallel to line m	
$j \perp k$	Line j is perpendicular to line k	
$\angle PRS$	Angle PRS	
$\bullet Z$	Point Z	$\bullet$ Z

2. Given the dilation to the right, answer the following questions:
a) Name all of the pairs of sides which are parallel to each other:

$\overline{AB} \parallel \overline{A'B'}$, $\overline{BC} \parallel \overline{B'C'}$, $\overline{CD} \parallel \overline{C'D'}$, $\overline{AD} \parallel \overline{A'D'}$

b) Given that the scale factor is 3 and AB is 12 centimeters, what is A'B'?

$A'B' = 12 \cdot 3 = \boxed{36 \, cm}$
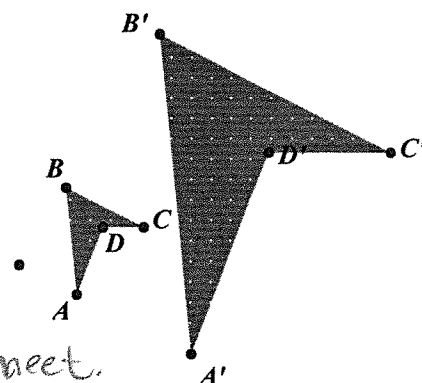
3. Using patty paper, explain how to make:
a) The perpendicular bisector of a segment.
① Fold the patty paper so your two endpoints meet.
② Crease the patty paper.
③ Trace the fold line you just made.

b) The angle bisector of an angle.
① Fold the patty paper so the two rays of the angle meet.
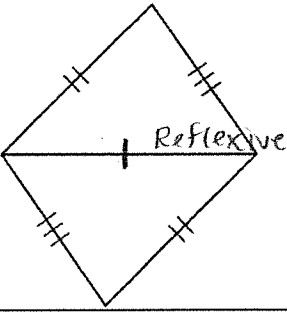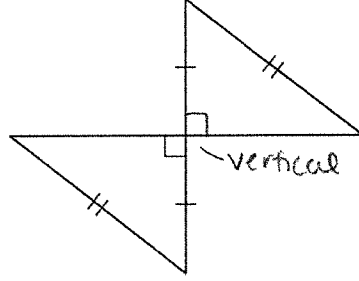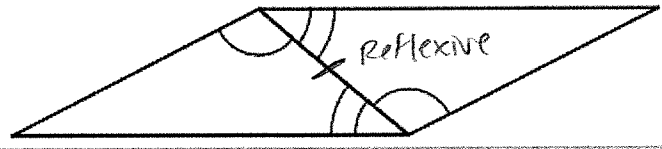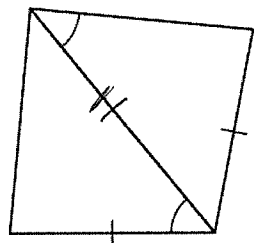② Crease the patty paper.
③ Trace the fold line you just made.

c) The midpoint of a segment.
① Fold the patty paper so your two endpoints meet.
② Pinch the center and mark with a point.

4. Name all of the valid postulates or theorems that can be used to prove that two triangles are congruent.
AAA, SAS, SSS, AAS (HL)

5. For the following triangles, determine whether they are congruent and by which theorem or postulate. If they are not congruent, explain why not.

SSS Reflexive	Not ≅ or HL Thm. vertical
Reflexive ASA	Not ≅ SSA not a valid postulate.

6. Write a congruent statement for the following triangles:

$\triangle RQS \cong \triangle SDC$

$\triangle QSR \cong \triangle QCA$
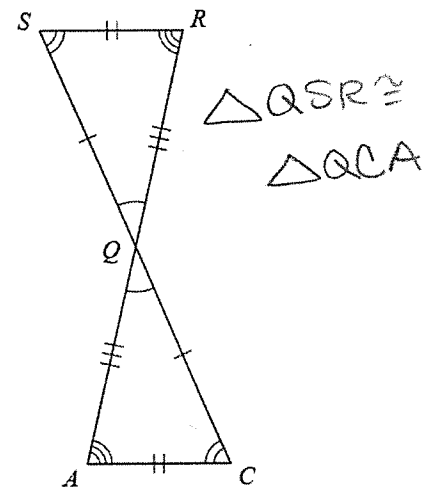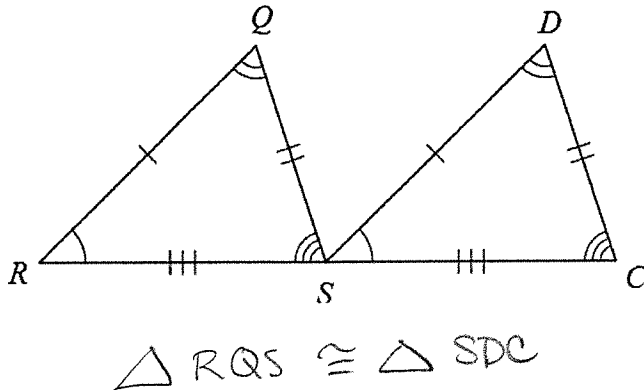
7. Using the triangle from above left, complete the following congruence statements:

$\angle QRS \cong \angle DSC$; $\angle CDS \cong \angle SQR$; $\overline{DS} \cong \overline{QR}$; $\overline{RS} \cong \overline{SC}$; $\overline{DC} \cong \overline{QS}$

8. What additional information would be needed to prove the triangles are congruent using ASA?

$\overline{FG} \cong \overline{FG}$ Reflexive.

$\boxed{\angle KGF \cong \angle GFH}$
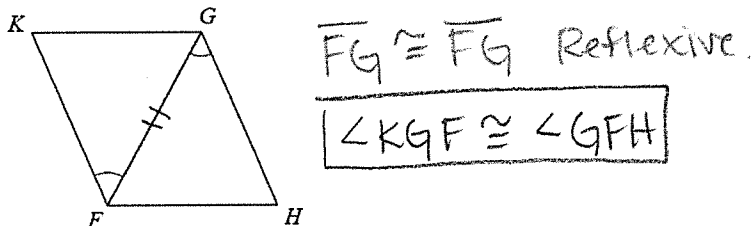
9. Draw a picture to solve for x in the following problem: $\triangle EFH \cong \triangle DPS$, $m\angle E = 5x + 6$; $m\angle D = 2x + 33$; $m\angle S = 2x - 6$.
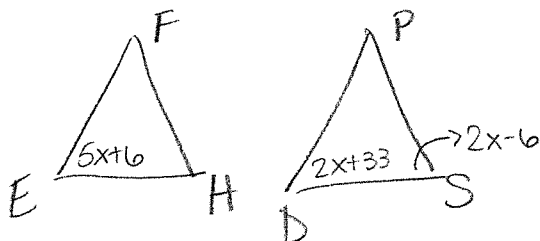
$\angle E \cong \angle D$

$5x + 6 = 2x + 33$

$\quad -2x \qquad -2x$

$3x + 6 = 33$

$\qquad -6 \quad -6$

$\dfrac{3x}{3} = \dfrac{27}{3}$

$\boxed{x = 9}$

Use the following picture for questions 10 – 12. The original triangle is in grey.
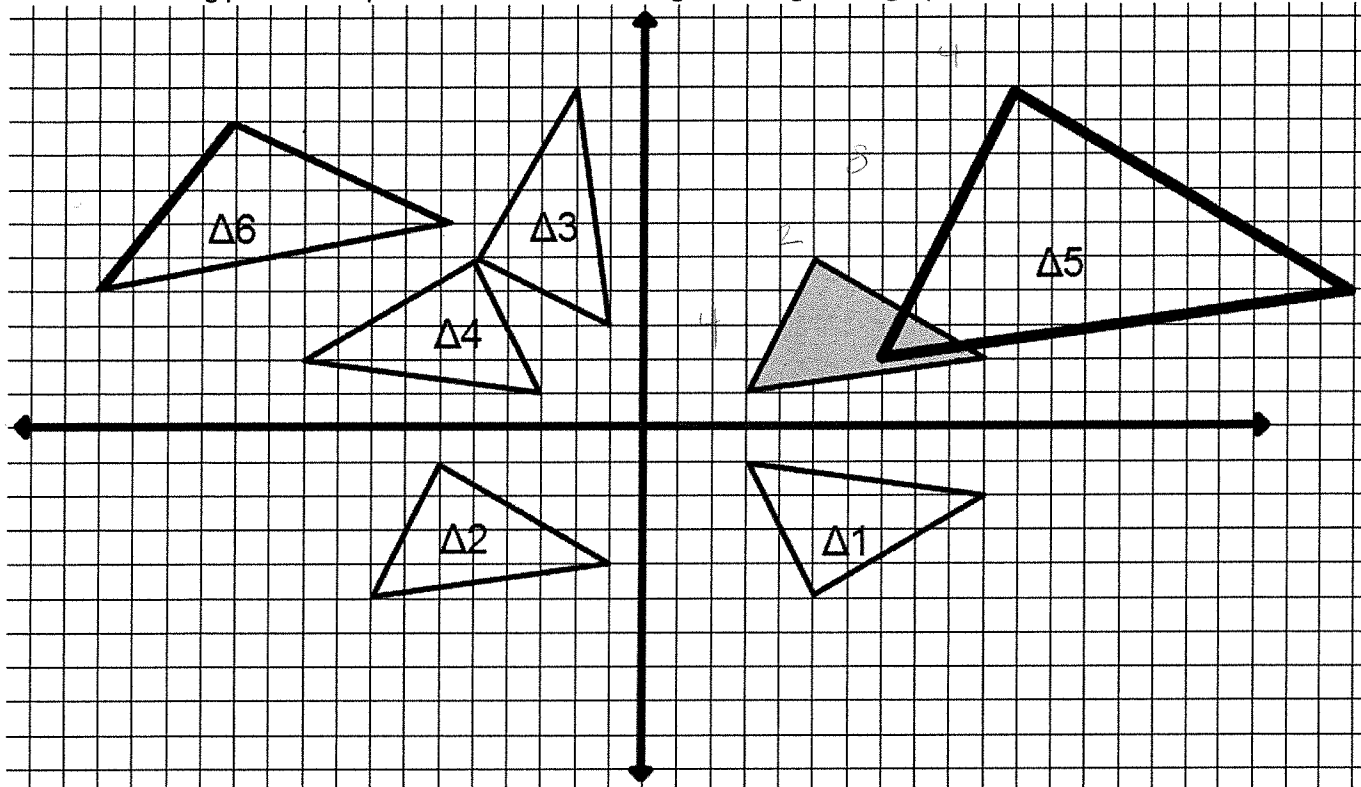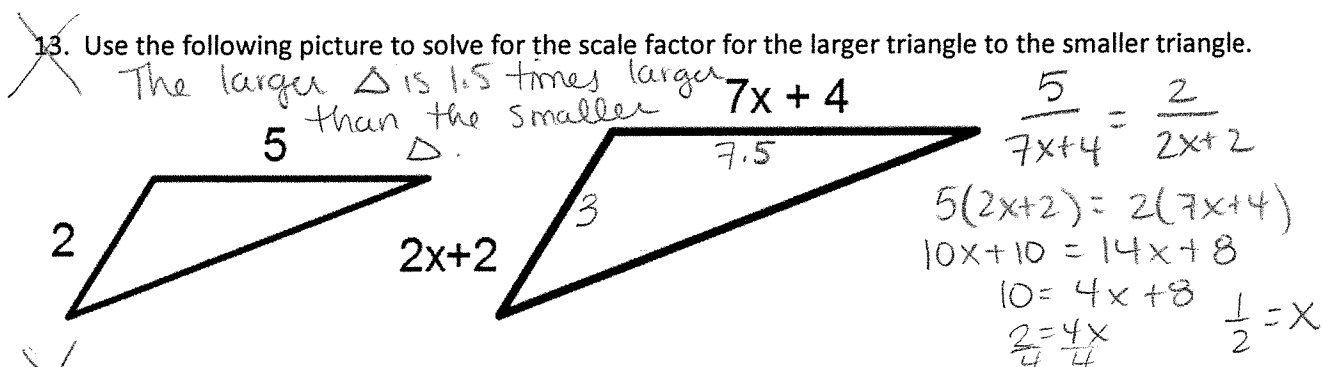

10. For each of the triangles, describe the transformation and then write a general rule for the transformation shown.

Triangle Number	Describe Transformations	Write a Rule
Δ1	Reflection over x-axis	$(x, y) \rightarrow (X , -y)$
Δ2	Translation left 11, down 6	$(x, y) \rightarrow (-11 , -6)$
Δ3	90° Rotation	$(x, y) \rightarrow (-y , X)$
Δ4	Reflection over y-axis	$(x, y) \rightarrow (-x , y)$
Δ5	Dilation by factor of 2; Translation right 1.	$(x, y) \rightarrow (2x+1 , 2y)$
Δ6	Dilation & Translation	$(x, y) \rightarrow (\underline{\quad} , \underline{\quad})$

11. Which of the triangles are congruent to the original? △1, 2, 3, 4

12. Which of the triangles are similar to the original? △ 5, 6

13. Use the following picture to solve for the scale factor for the larger triangle to the smaller triangle.

The larger △ is 1.5 times larger than the smaller △.

$$\frac{5}{7x+4} = \frac{2}{2x+2}$$

$$5(2x+2) = 2(7x+4)$$

$$10x+10 = 14x+8$$

$$10 = 4x+8$$

$$2 = 4x$$

$$\frac{2}{4} = \frac{4x}{4}$$

$$\frac{1}{2} = X$$

14. A 5'6" man casts a shadow that is 12 feet long. What is the height of a tree that casts a 20 foot shadow?

6 in = ½ foot

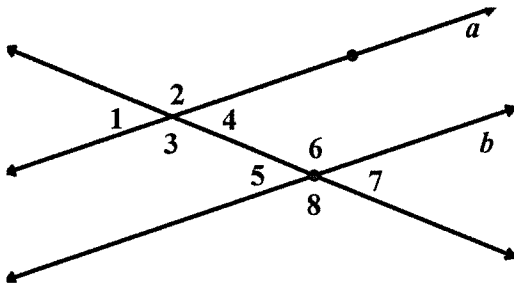$$\frac{5.5\,ft}{12\,ft} = \frac{x}{20\,ft}$$

$$110 = 12x$$

$$\frac{110}{12} = \frac{12x}{12}$$

$$\frac{55}{6} = X$$

$$9\frac{1}{6} = X$$

The tree is 9ft 2in tall.

Use the following diagram for questions 15 – 20. $a \parallel b$.

15. Name all the pairs of vertical angles.
1&4, 2&3, 6&8, 5&7

16. Name all the pairs of same-side interior angles.
3 and 5 , 4 and 6

17. Name all the alternate interior angles.
3 and 6, 4 and 5

18. Name all the corresponding angles.
1&5, 3&8, 2&6, 4&7

19. Name 4 linear pairs.
5 & 8, 3&4, 6&7, 1&3

20. Which of the above types of angles are congruent?
Vertical, corresponding, alternate interior.

Which of the above type are supplementary?
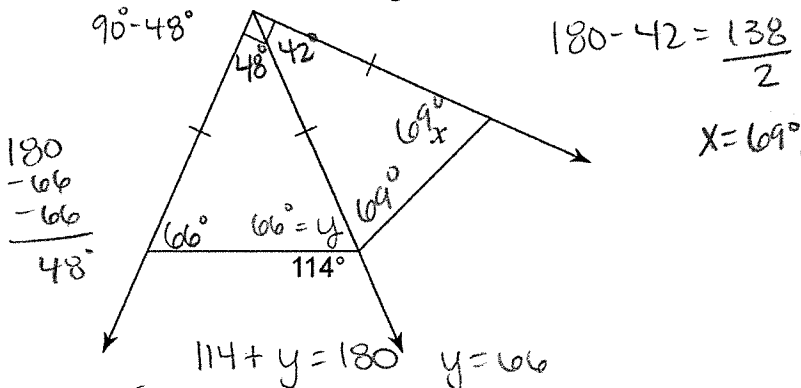Same side interior
Linear pair.

21. Complete the following proof:
Given: $a \parallel b$
Prove: $m\angle 1 + m\angle 8 = 180°$

Statements	Justifications
1. $a \parallel b$	1. Given
2. $m\angle 5 + m\angle 8 = 180°$	2. Linear Pair
3. $m\angle 5 \cong m\angle 1$	3. Corresponding angles of parallel lines are congruent
4. $m\angle 1 + m\angle 8 = 180$	4. Substitution

22. Solve for x in the diagram below.

$90° - 48°$

$\begin{array}{r} 180 \\ -66 \\ -66 \\ \hline 48° \end{array}$

$180 - 42 = \dfrac{138}{2}$

$X = 69°$

$114 + y = 180$ $y = 66$

23. Select all the statements that are **true** for similar figures:
A) All the corresponding angles have the same ratio.
B) All the corresponding sides have the same ratio.
C) All the corresponding angles are congruent.
D) All the corresponding sides are congruent.