
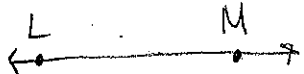



FUNDAMENTAL CONCEPTS OF GEOMETRY

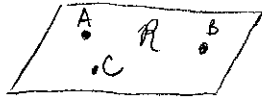
Points

Diagram: 	Notes: a single point
Named: P, "point P"	

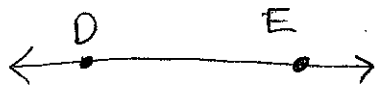
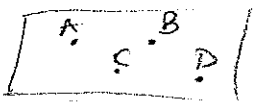
Lines

Diagram: 	Notes: two points connected, where the line continues in both directions
Named:  "line LM"	


Planes

Diagram: 	Notes: at least three points that are not on the same line, can use cursive letter to name *think pieces of paper
Named: plane ABC, plane R	

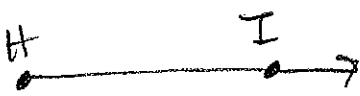
Special Points

Collinear Points: points lie on the same line	Coplanar Points: points lie on the same plane
Diagram: 	Diagram: 

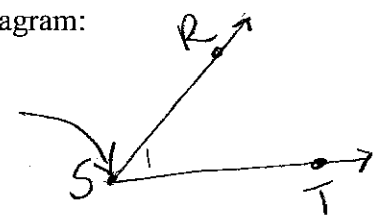
Segments

Diagram:		Notes:
Named:	\overline{FG} , "segment FG"	Like a line - at least 2 points but <u>DOES NOT</u> continue in either direction

Rays

Diagram:		Notes:
Named:	\overrightarrow{HI} , "ray HI"	Like a line or segment, but only continues in one direction (the direction of the arrow)

Angles

Diagram:		Named:
Notes:	An angle is best described by the three points on the two rays that connect to each other at the vertex	
		1) $\angle ST$ BEST 2) $\angle S$ 3) $\angle 1$

- V. **Intersect:** When figures have one or more points in common they intersect.
- N. **Intersection:** The set of points in common is the intersection.
- Postulates:** Statements accepted as true w/o proof

Name Key

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Homework _____

1.2 Measuring Segment Lengths

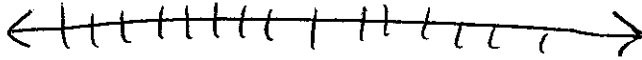
Objectives:

- A. I can find the distance between points.
- B. I can correctly use the congruence symbol.
- C. I can use the segment addition principle to solve problems.

The Geometry "Ruler"

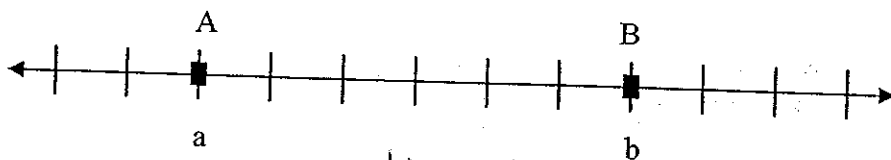
A Number Line:

Sketch:

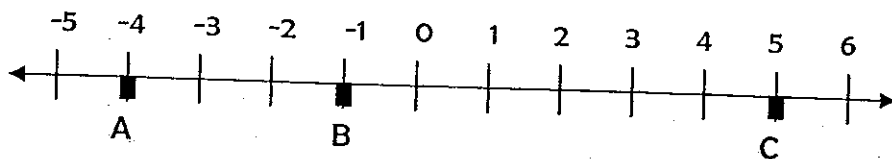
Points on a line are located by the coordinate.Two points on a number line have a distance between them.

Finding the length of a segment

Let A and B be points on a number line with coordinates a and b.

The measure (or length) of \overline{AB} is $|b-a|$ or $|a-b|$.

For questions 1-3 find the lengths from the number line.



1. $m \overline{AB} =$

$$|-4 - (-1)| = |-4 + 1|$$

3

2. $m \overline{AC} =$

$$|-4 - 5| = |-9|$$

9


3. $m \overline{BC} =$

$$|5 - (-1)| = |5 + 1|$$

6

Congruent Segments

Congruent Figures: are figures of the same size & shape

Symbol:


Write XY is congruent to YZ: $\overline{XY} \cong \overline{YZ}$

On shapes, tick marks are used to show congruence. The number of marks designates segments that are congruent to each other.

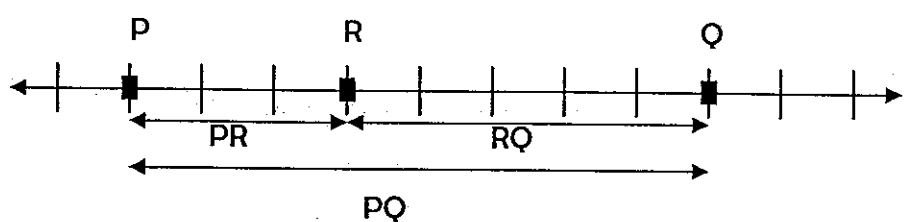
Assume the figure is a rectangle. Mark the congruent sides with tick marks.



The segment congruence postulate: If two segments have the same length as measured by a fair ruler, the segments are congruent.

If $\overline{AB} = \overline{CD}$, then $\overline{AB} \cong \overline{CD}$ If $\overline{WX} \cong \overline{YZ}$, then $\overline{WX} = \overline{YZ}$

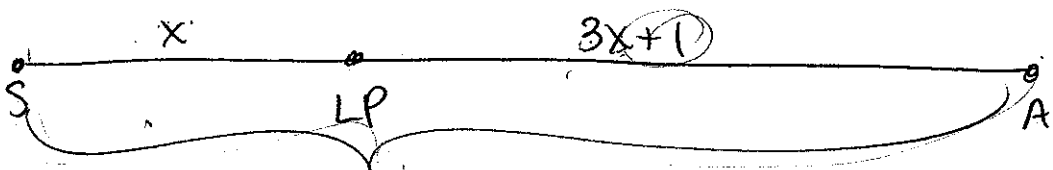
Segment Addition



The segment addition postulate: If point R is between points P and Q on a line, then $PR + RQ = PQ$

Draw a picture and solve:

Scott lives 25 miles away from Amy. Lincoln Park is between them. The distance from Amy to Lincoln Park is 1 mile more than 3 times the distance from Scott to Lincoln Park. Find the distance from Scott to Lincoln Park and from Amy to Lincoln Park.



$$x + 3x + 1 = 25$$

$$4x + 1 = 25$$

$$\begin{array}{r} -1 \\ -1 \end{array}$$

$$\frac{4x}{4} = \frac{24}{4}$$

$$x = 6$$

Scott 6 mi
 Amy $6(3) + 1 = 19$ mi

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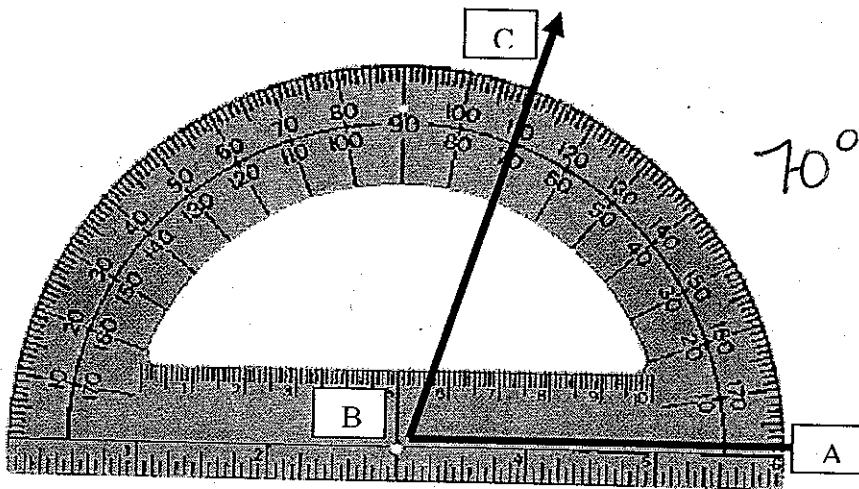
Homework _____

1.3 Measuring Angles

Objectives:

- A. I can measure angles using a protractor.
- B. I can use the angle congruence postulate.
- C. I can find complementary and supplementary angles.
- D. I can classify angles as right, obtuse or acute.

Protractors and Measuring Angles



The center of the protractor is at the vertex.

AB is aligned through 0 on the protractor.

The angle measure is where CB intersects the scale.

The standard units of measurement for angles are degrees.

A protractor is 180° or a half of a circle.

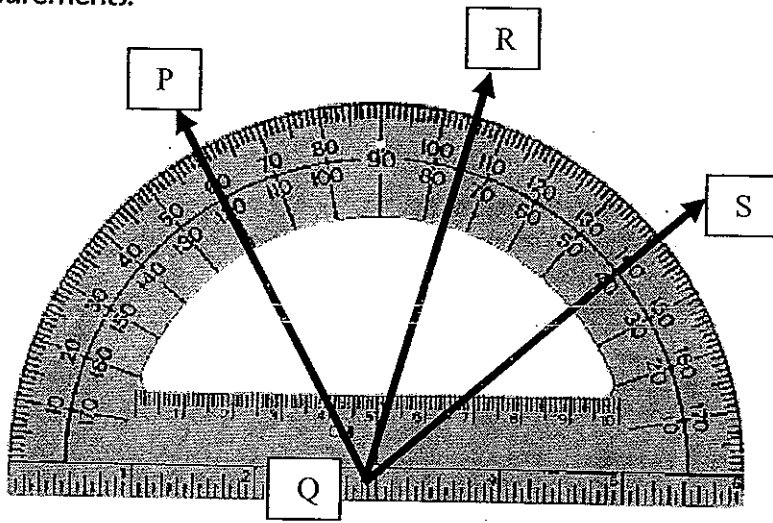
Classifications of Angles

Right Angle: 90° Symbol: ⊥

Acute Angle: less than 90°

Obtuse Angle: more than 90°

Find the measurements:



$\angle PQR = 45^\circ$ $\angle RQS = 35^\circ$ $\angle PQS = 80^\circ$
 Note: $\angle PQS = \angle PQR + \angle RQS$

Angle Congruence

Angle Congruence Postulate: If two angles have the same measure, then they are congruent. AND VICE VERSA

If $\angle ABC = \angle XYZ$, then $\angle ABC \cong \angle XYZ$ If $\angle DEF \cong \angle PQR$, then $\angle DEF = \angle PQR$

Special Angle Pairs

Complementary Angles: add to 90° 90°

Each angle is the complement of the other.

Supplementary Angles: add to 180° 180°

Each angle is the supplement of the other.

Linear Pair: Formed by a line and a ray intersecting a line

A linear pair of angles are also Supplementary

<p>Complementary:</p> <p>$a + b = 90^\circ$</p>	<p>Supplementary:</p> <p>$c + d = 180^\circ$</p>	<p>Linear Pair:</p> <p>$e + f = 180^\circ$</p>
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Name Key

Block _____ Date _____

Homework _____

1.4 – 1.5 Lines, Bisectors, Triangles, and Circles

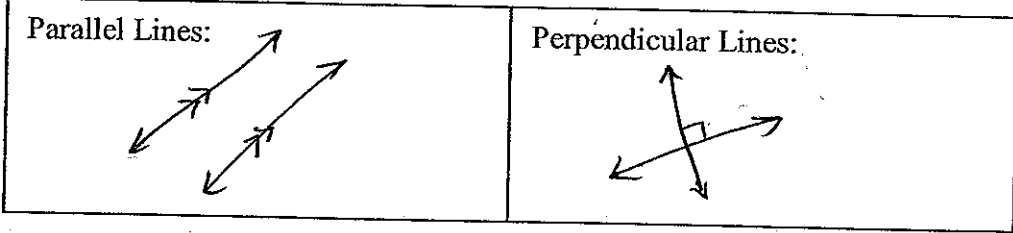
Objectives:

- A. I can define parallel and perpendicular lines.
- B. I can create segment and angle bisectors.
- C. I can properly mark bisectors.
- D. I can create inscribed and circumscribed circles.
- E. I can create an altitude and median of a triangle.

Parallel and Perpendicular Lines

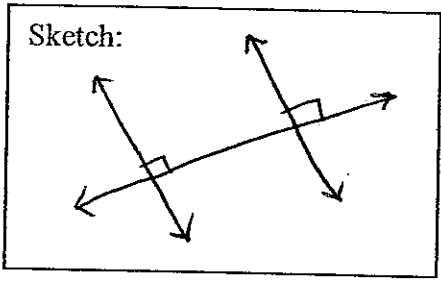
Parallel Lines: Two coplanar lines that do not intersect

Perpendicular Lines: Two coplanar lines that intersect to form right angles



If two coplanar lines are perpendicular to the same line, then...

they are
parallel
(conjecture)

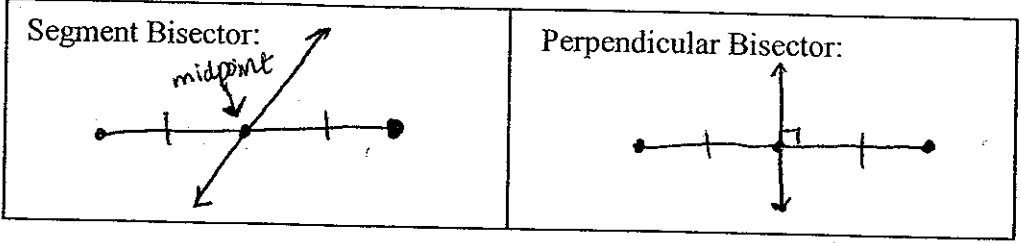


Bisectors

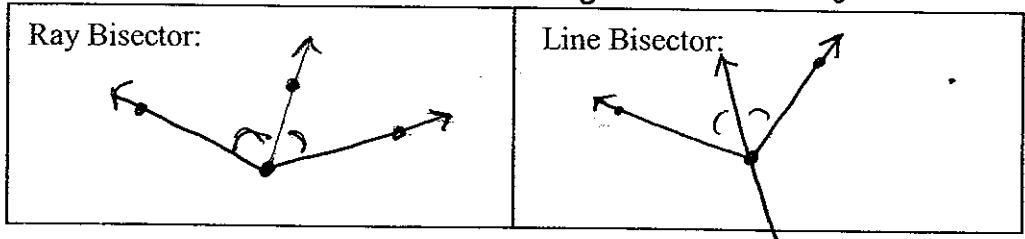
Segment Bisector: a line that divides a segment into two congruent parts

Midpoint: the point where the bisector intersects the segment

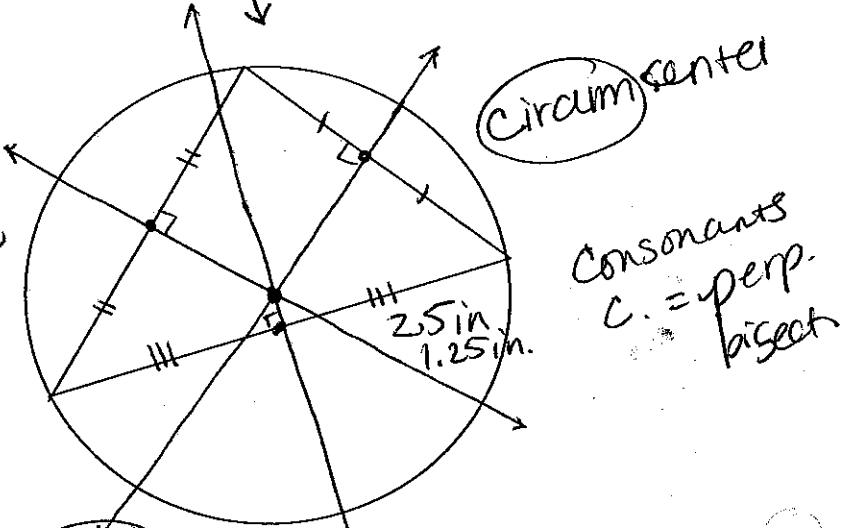
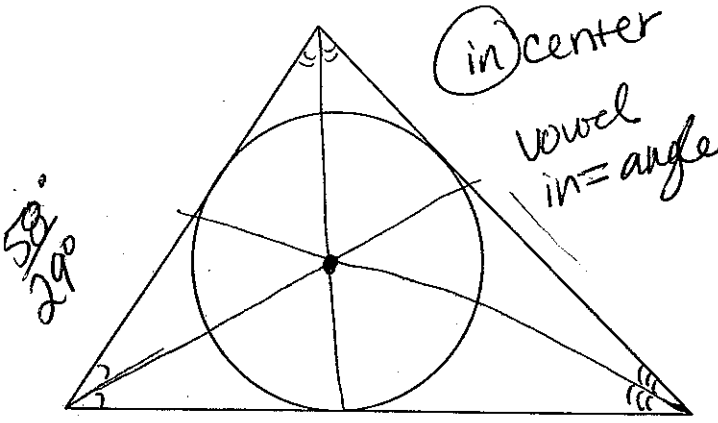
Perpendicular Bisector: a bisector that is perpendicular to the segment



Angle Bisector: a line or ray that divides an angle into two congruent angles



Triangles and Circles:



Inscribed Circle: a circle inside the triangle and touches three sides

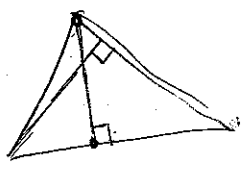
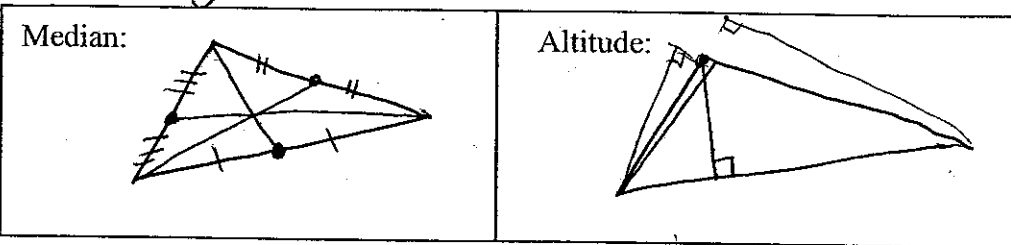
Circumscribed Circle: a circle outside the triangle and contains all vertices

Angle bisectors of a triangle: intersect at the center of the inscribed circle

Perpendicular bisectors of a triangle: intersect at the center of the circumscribed circle

Median: The ^{segment} ~~line~~ from a vertex to the midpoint of the other side

Altitude: The segment perpendicular to a side and connecting to the opposite vertex



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1.6 Translations, Rotations, and Reflections

Objectives:

A. I can describe and perform different types of transformations.

Rigid Transformations

Rigid Transformations change the figure's direction but do not change the figure's size or shape.

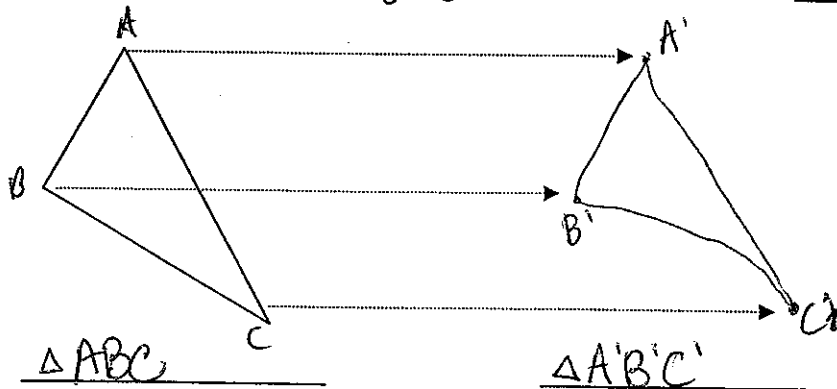
The original figure is the pre-image.

The transformed figure is the image.

Coordinates of the image are named by adding the (1) prime symbol.

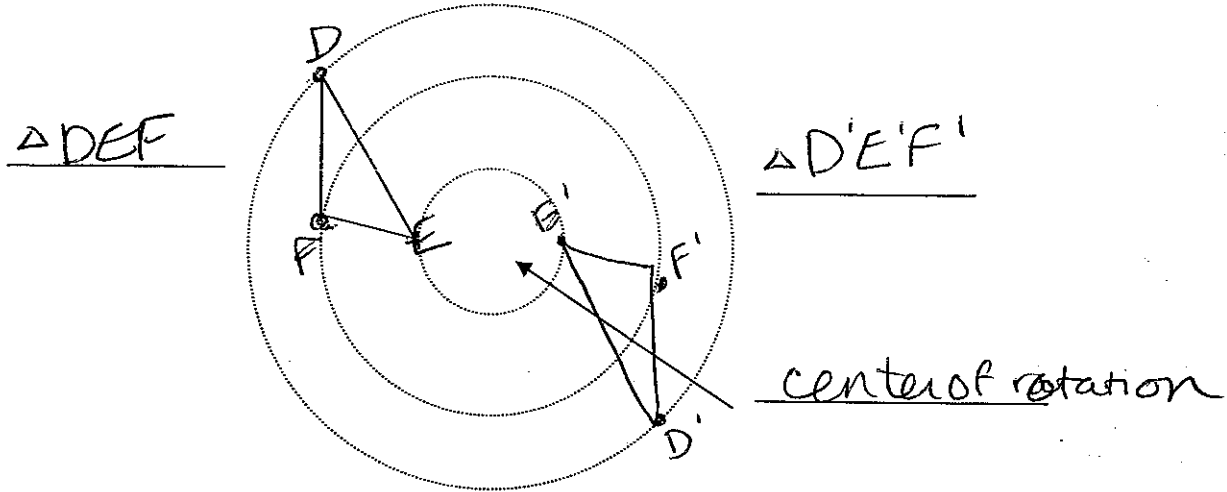
Translations

In a Translation, every point of the figure moves in a straight line and all points move the same distance in the same direction.



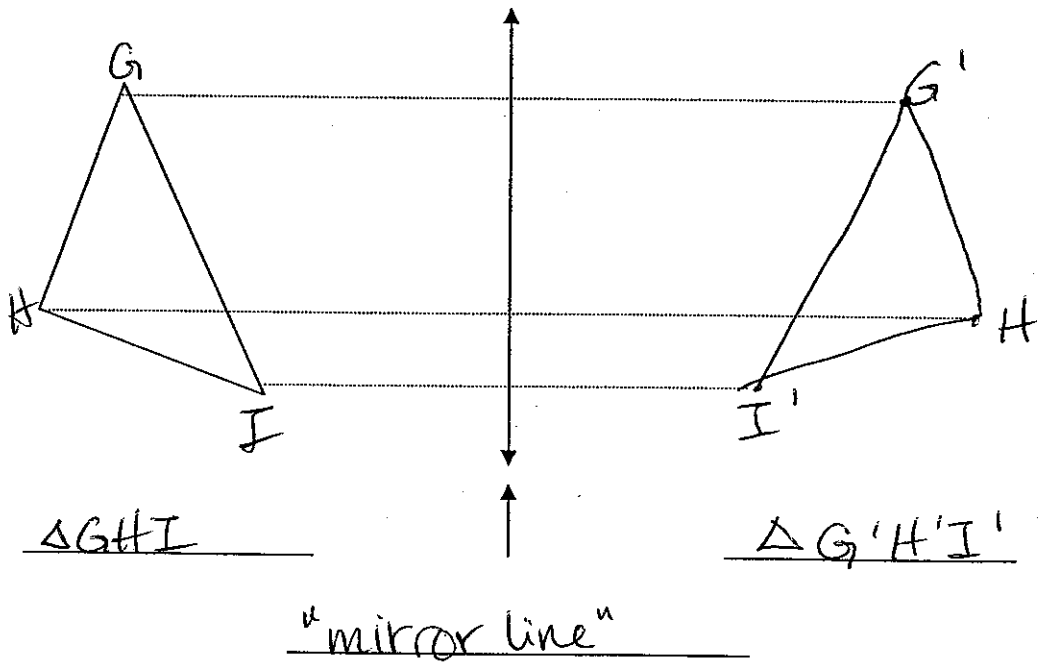
Rotations:

In a Rotation, every point of the figure moves around a given point named the center of rotation the same angle measure



Reflections:

In a Reflection, every point is flipped across a line that is the mirror line between the preimage and image points.



A Glide reflection is a reflection and a translation at the same time

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1.7 Transformations in the Coordinate Plane

Objectives:

- A. I can describe and perform transformations in the coordinate plane.
 B. I can write the rule for transformations.

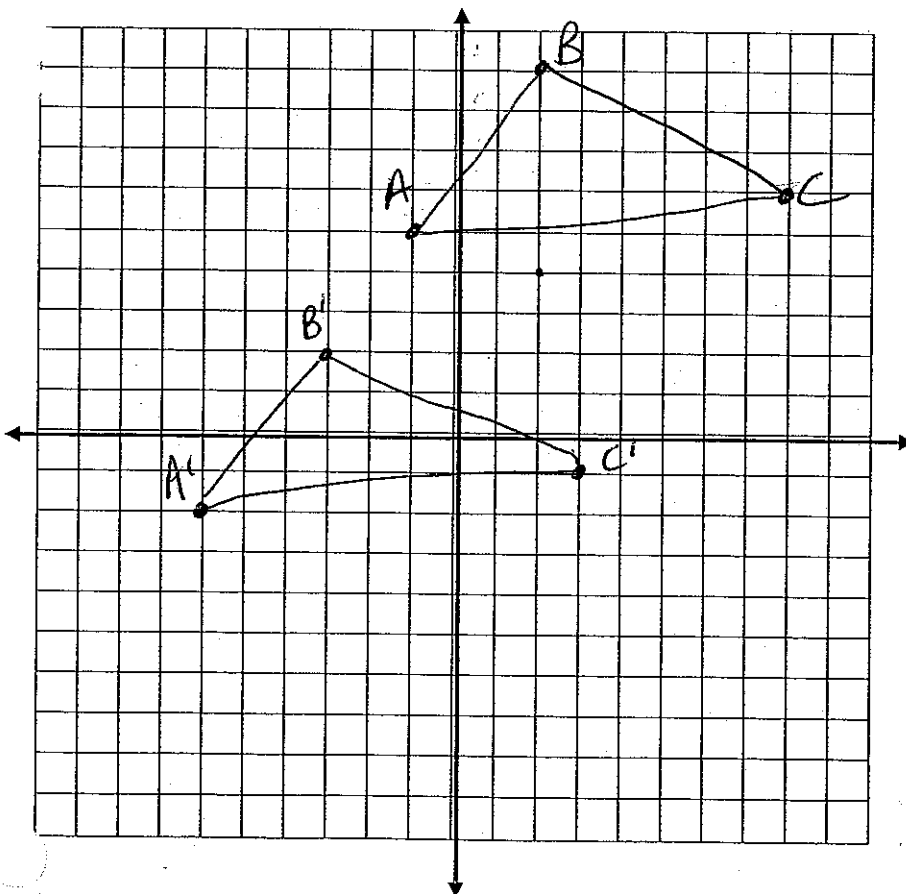
Translations

Horizontal Translations: x coordinate $\begin{matrix} - \\ \text{left or right} \\ + \end{matrix}$ y coordinate Same

Vertical Translations: x coordinate Same y coordinate $\begin{matrix} - \\ \text{down or up} \\ + \end{matrix}$

Diagonal Translations: x and y coordinates both down/up ^{and} left/right

Have students do all graphing at board



Plot and connect points A, B, and C.

A (-1, 5)

B (2, 9)

C (8, 6)

Translate triangle ABC 5 units left and 7 units down.

How do the coordinates change?

x: $x - 5$

y: $y - 7$

New coordinates:

A' (-6, -2)

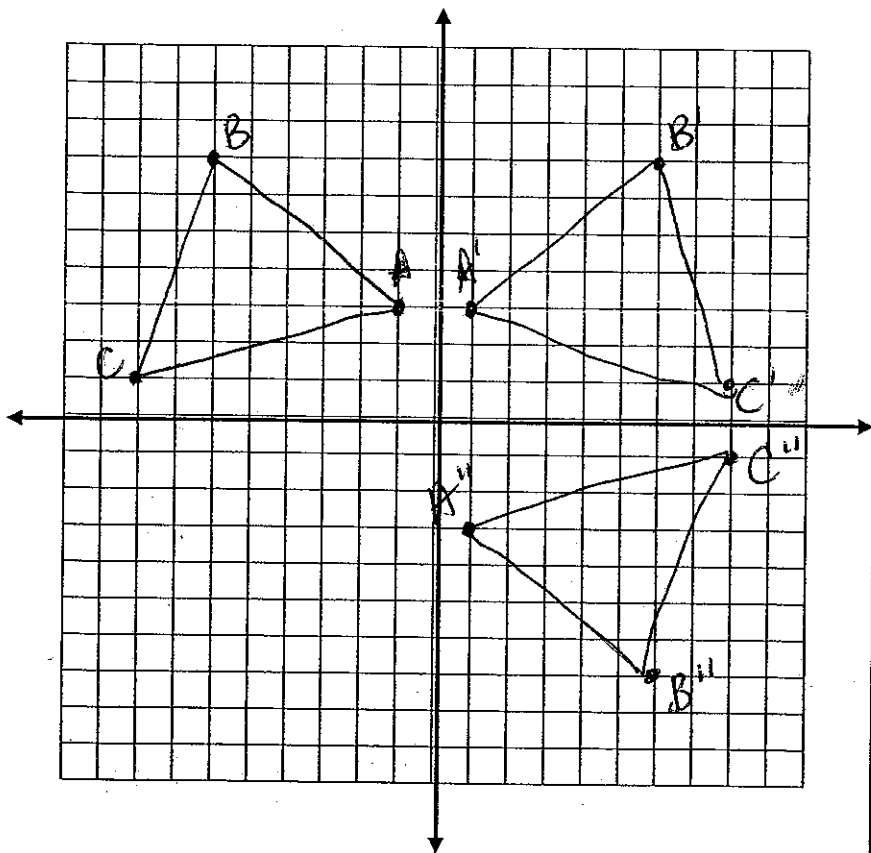
B' (-3, 2)

C' (3, -1)

Reflections

Over the x-axis: x coordinate same y coordinate opposite

Over the y-axis: x coordinate opposite y coordinate same



Plot and connect points A, B, and C.

- A (-1, 3)
- B (-6, 7)
- C (-8, 1)

Reflect the triangle over the x axis:

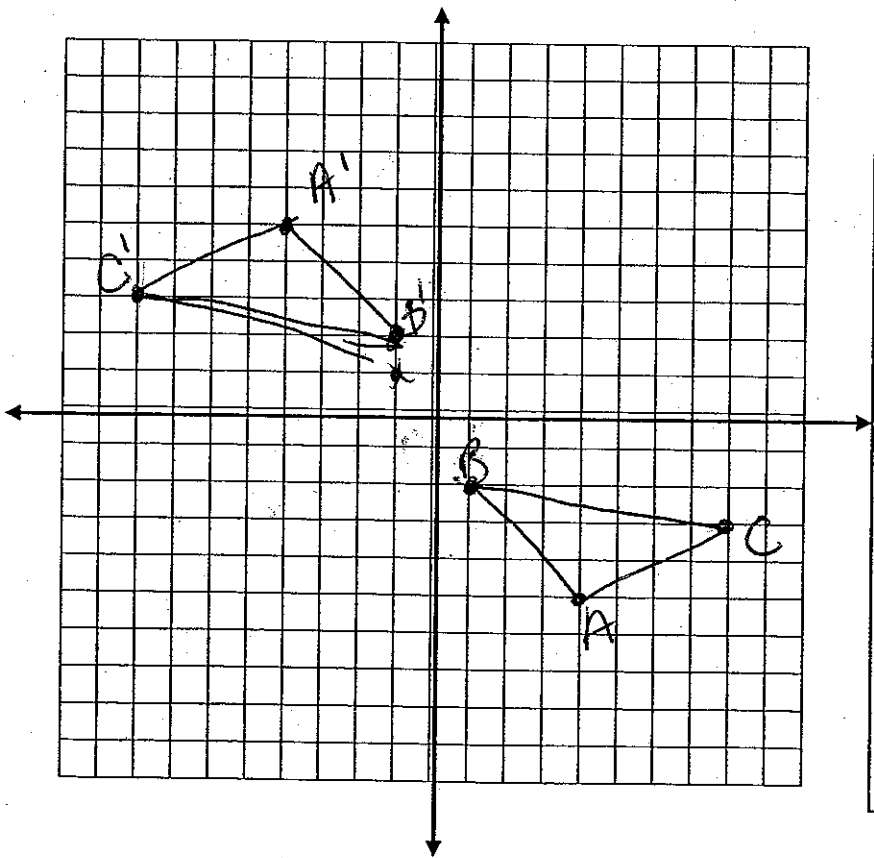
- A' (1 , -3)
- B' (-6 , -7)
- C' (-8 , -1)

Reflect the triangle over the y axis:

- A'' (1 , 3)
- B'' (6 , 7)
- C'' (8 , 1)

Rotations

For 180° Rotations about the origin: x and y coordinates both are opposite



Plot and connect points A, B, and C.

- A (4, -5)
- B (1, -2)
- C (8, -3)

Rotate the triangle 180° about the origin:

- A' (-4, 5)
- B' (-1, 2)
- C' (-8, 3)