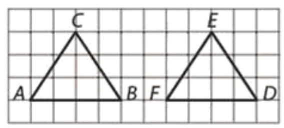
Day 1: Introduction to Transformations and Translations

Warm-Up:

Transformations: Translations

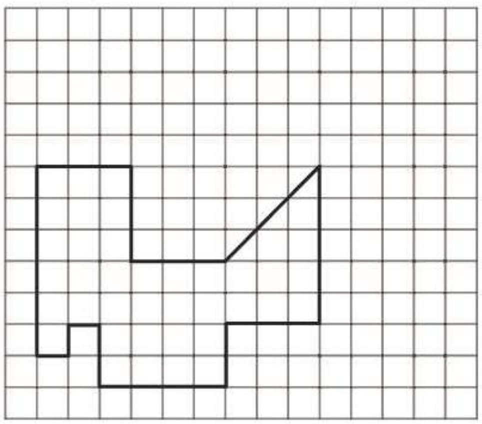
A **translation**, or a slide, is the movement of a figure from one position to another without turning. To the right are examples of a horizontal slide and a vertical slide.

horizontal slide

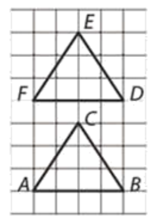


6 units to the right

Look at the figure below. Slide the figure 4 units to the right and 4 units up. Draw the image on the graph.



vertical slide

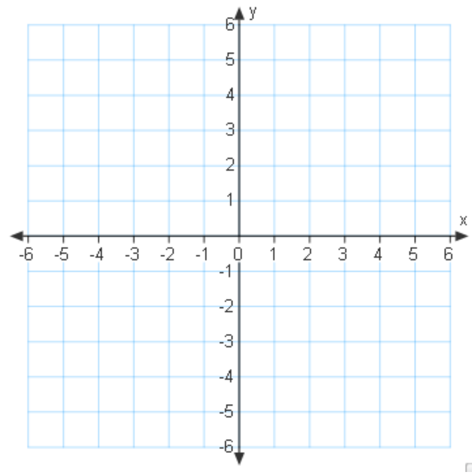


4 units up

Prerequisite Skill: Graphing Lines

Graph the following lines.

1) x = 2
2) y = 4
3) y = x (Hint: this is y = 1x + 0)
4) y = -x (Hint: this is y = -1x + 0)



Introduction to Transformations and Translations

Congruent figures ______________________

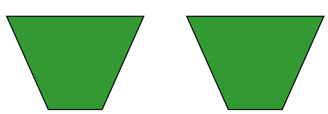
____ .

When two figures are congruent, you can move one so that ____________________________

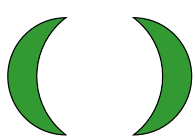
____.

Three ways to make such a move:

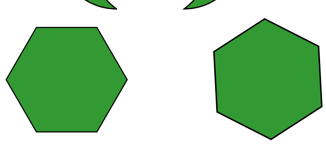
A __________



A __________



A __________



A **transformation** is ______________________

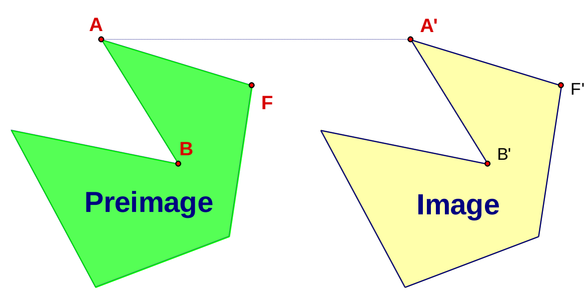
____.

The _____________ is the ______________.

The _____________ is the ______________ and is named by adding a ____________________.

Example: ______________________________

____.



A **translation** _________________________

____

____.

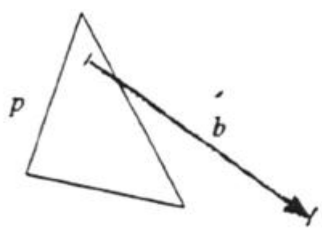
Translation Discovery

1. Gerald is rearranging the furniture in his living room. He has to leave before he is finished, so he draws the diagram below for his wife to place the endtable. Draw the new position of the endtable.

Include the answers to the following questions in your explanation. Use complete sentences!

- What method did you use?
- Is there only one possible answer?
- What does the arrow tell you?
- What do you call this motion?
- What could you call the table before it moved? After?

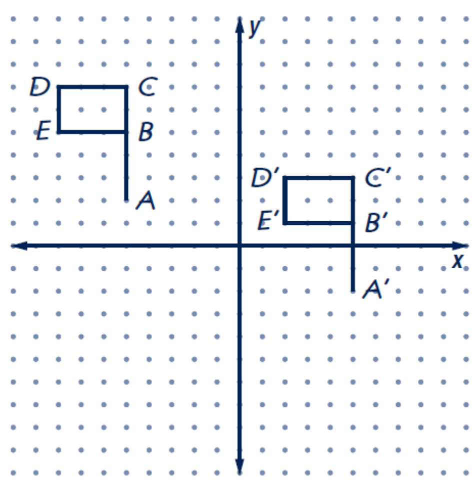
2. Draw the image of figure p when translated using arrow b. Explain your method.



Include the answers to the following questions in your explanation. Use complete sentences!

- What method did you use?
- Is there only one possible answer?
- What does the arrow tell you?
- How do you know how far to move?

3.



Include the answers to the following questions in your explanation. Use complete sentences!

- Describe the translation as precisely as you can.
- Under this translation, what would be the image
  - of (0, 0)?
  - of (1, -5)?
  - of (-5, -4)?
  - of (a, b)?

Three ways to describe a transformation:

Words ____

Algebraic (motion) rule ____

Vector ____

Practice: Marching Band Activity (separate handout)

Day 2: Reflections

Warm-Up:
Using the points A(3, -4), B(1, 3), C(-2,1), D(-3, -5), perform each rule and give the resulting image points and the requested information.

1) translate right 2, down 5

Algebraic Rule: ___________________

2) translate left 6, up 4

Algebraic Rule: ___________________

3) translate using the rule (x, y) -> (x, y - 6)

Description: ___________________

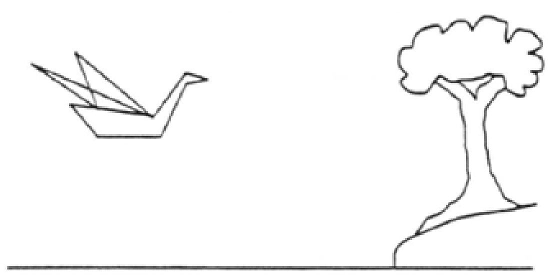
4) translate using the vector < -1, 2 >

Description: ___________________

Reflections

Reflections Introduction

Bill is sitting on a boat on a smooth, placid mountain lake. In the distance he sees the scene picture below, in which a swan is flying over the lake toward a distant tree. He also sees an image of the swan in the lake. Draw a picture of what Bill sees in the lake. Answer the questions.



1. How did you draw your picture?

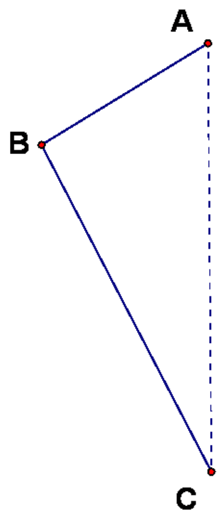
2. What type of transformation would you call this?

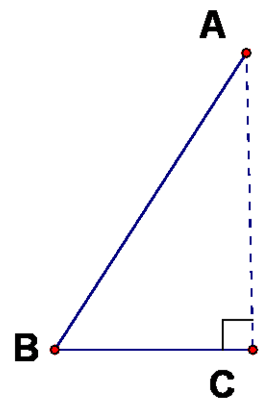
3. What transformations term would you use to describe the swan?

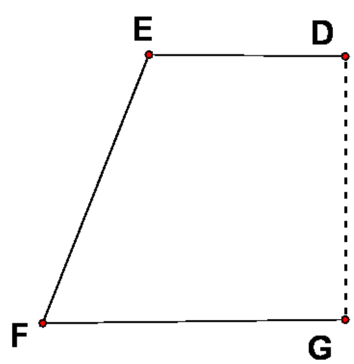
4. What transformations term would you use to describe the swan's reflection?

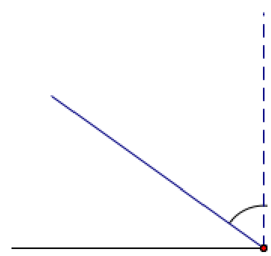
Patty Paper Reflections

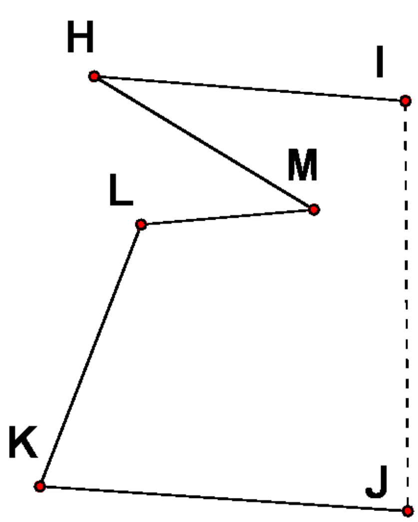
Use patty paper to reflect each figure across the dashed-line side. Label the image points with proper notation.





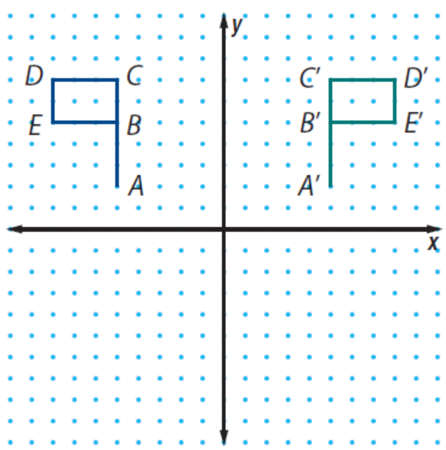






Reflection Coordinates Discovery (from Core Plus 2 p. 202-203)

Reflected Across the *y*-axis



1. A flag, ABCDE, is shown in the 2nd quadrant. Its reflected image is shown in the 1st quadrant.

a. What line was the flag reflected over?

b. Investigate patterns in the *x* and *y* coordinates of the preimage points and their corresponding images.

c. Use the pattern you observed to write a single algebraic rule that performs a reflection over the y-axis.

d. Draw dashed segment between points A and A′. What do you notice about the relationship of the dashed line and the *y*-axis? What do you notice about the distance from point A to the *y*-axis and point A′ to the *y*-axis? Do the same with points C and C′. Do you notice the same relationship?

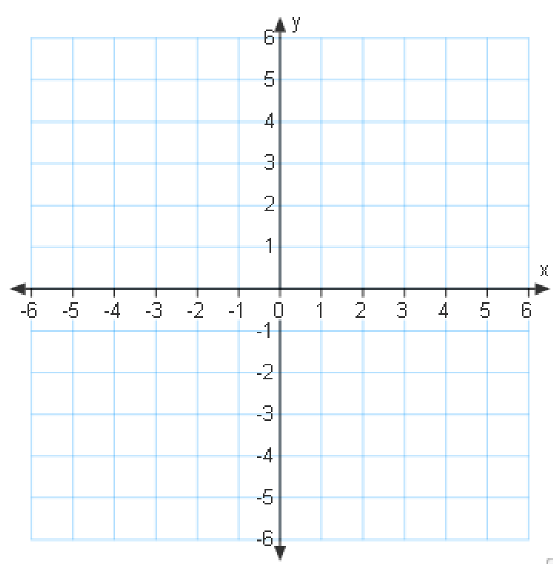
2. The table to the right shows the coordinates of six preimage points and a general point with coordinates (a,b). Plot each of the six points and its reflected image across the **x-axis.**

a. Record the coordinates of the image points in the table like the example shown.

b. What pattern relating coordinates of the preimage points to the image points do you observe? Use the pattern to predict the image coordinates of point (a,b).

Preimage	Reflected Image Across *x*-axis
$(-4, 1)$	$(-4, -1)$
$(3, -2)$	
$(-2, -5)$	
$(4, 5)$	
$(0, 1)$	
$(-3, 0)$	
(a, b)	

c. Use the pattern you observed to write a single algebraic rule that performs a reflection over the x-axis.

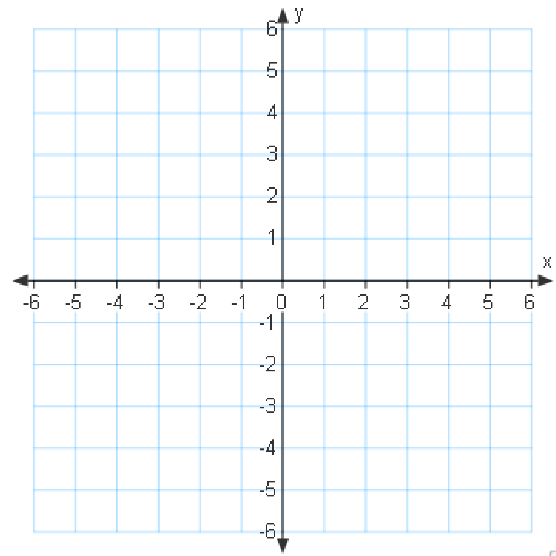


d. Draw dashed segment between preimage (-4,1) and image (-4,-1). What do you notice about the relationship of the dashed line and the *x*-axis? What do you notice about the distances each point to the x-axis?

3. Draw the graph of y = x. Plot each preimage point in the table and its reflected image across that line. Connect each preimage/image pair with a dashed segment.

a. Record the coordinates of the image points in the table.
b. Describe a pattern relating the coordinates of preimage points to image points.
c. Write an algebraic rule that would reflect any point (x,y) over the line y = x.

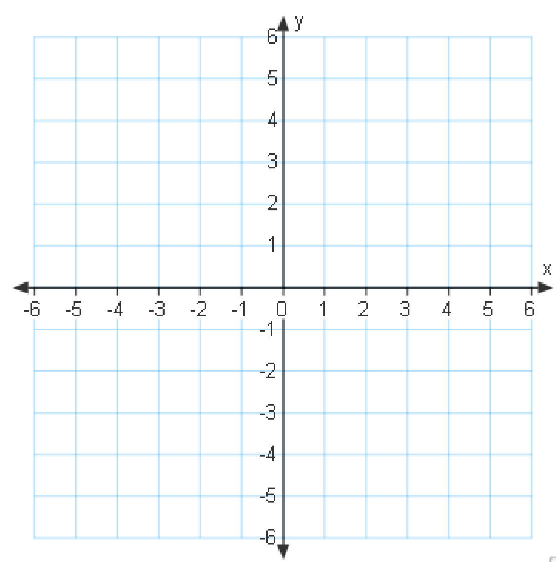
Preimage	Reflected Image Across $y = x$
(-4, 1)	(1, -4)
(3, -2)	
(-2, -5)	
(4, 5)	
(0, 1)	
(-3, 0)	
(a,b)	



4. Draw the graph of $y = -x$. Plot the preimage points from the previous part and their images when reflected across the line $y = -x$.

a. Record the coordinates of the image points in the table.
b. Describe a pattern relating the coordinates of preimage points to image points.
c. Write an algebraic rule that would reflect any point (x,y) over the line y = -x.

Preimage	Reflected Image Across $y = -x$
(-4, 1)	(-1, 4)
(3, -2)	
(-2, -5)	
(4, 5)	
(0, 1)	
(-3, 0)	
(a,b)	



Summary

Reflection: ____

Mirror: ____

Preimage and image points are ______________________ from the mirror line.

Perpendicular Bisector:____

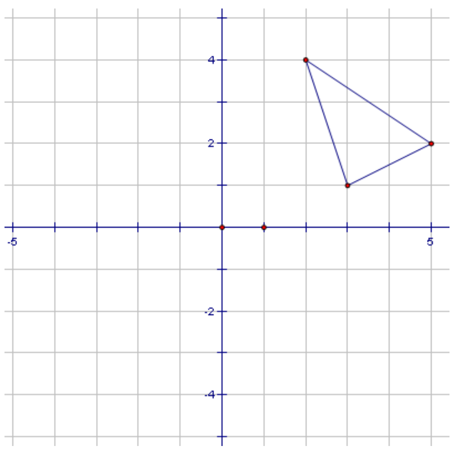
Algebraic Rules for Reflections:

Across the y-axis ____________________ Across the x-axis ____________________

Across the line y = x __________________ Across the line y = -x __________________

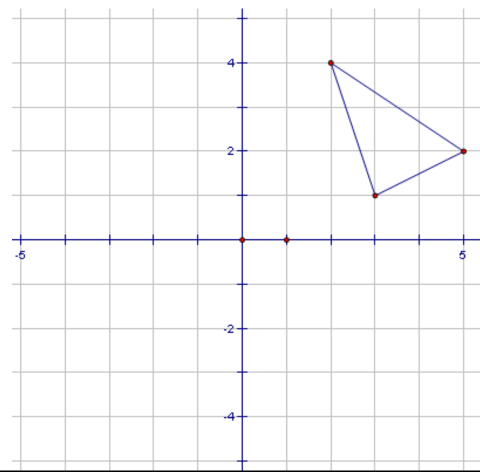
Practice: Find the image of the following transformations and give the requested information.

The points (2,4), (3,1), (5,2) are reflected with the rule $x, y \rightarrow x, -y$



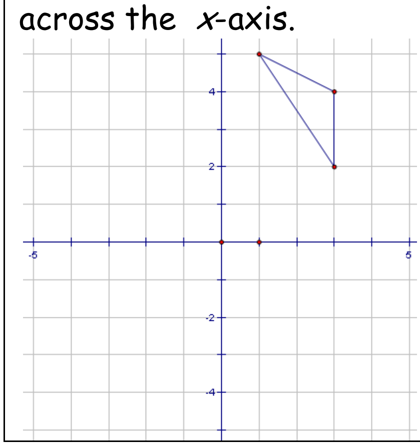
Description:

The points (2,4), (3,1), (5,2) are reflected with the rule $x, y \rightarrow -x, y$



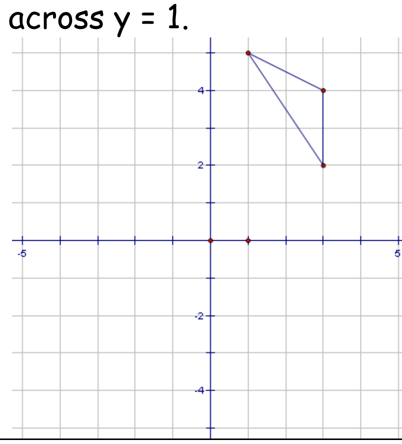
Description:

The points (3,2), (1,5), (3,4) are reflected across the x-axis.



Algebraic Rule:

The points (3,2), (1,5), (3,4) are reflected across y = 1.



Day 3: Rotations

Warm-Up: Given triangle ABC with A(-1, 4), B(4, 3) and C(1, -5), graph the image points after the following transformations, identify the coordinates of the image, and write the Algebraic Rule for each.

1) Translate left 3, up 2

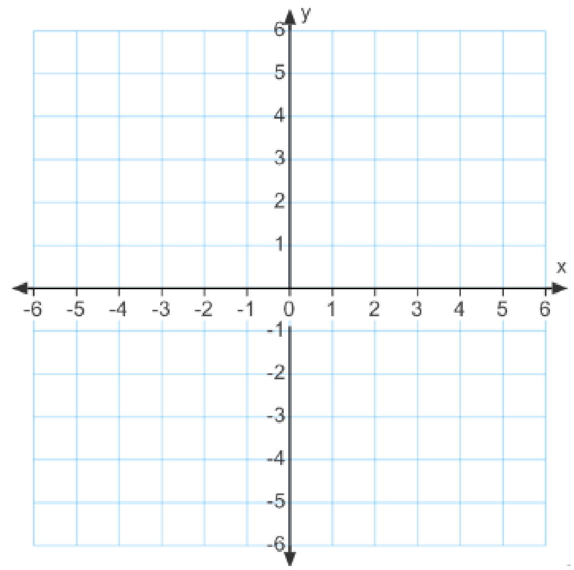
2) Translate right 2, down 1

3) Reflect over the x-axis

4) Reflect over the y-axis

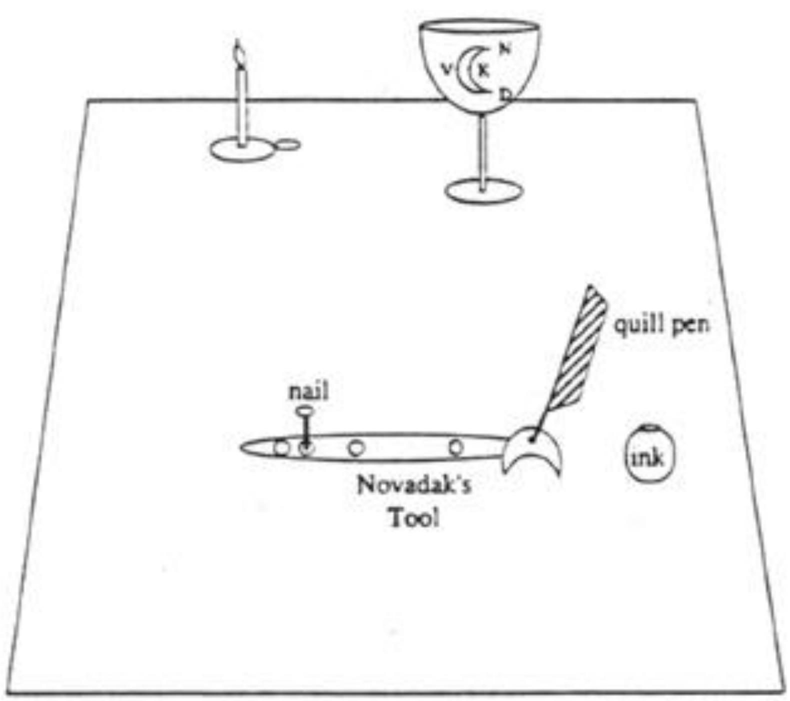
5) Solve the following system $4m + 18n = 80$

$$12m + 34n = 160$$



Rotations – Discovery Activity

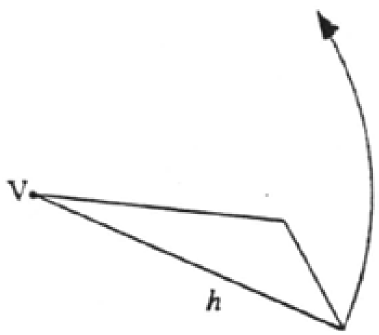
1. In the days of kings and wizards, Novadak, Merlin's cousin, had a wondrous drawing tool. When she secured a nail in one of the holes and placed a quill pen through the moon, she could create amazing designs. Imagine that she places a nail as shown and positions the tool so that it points toward the goblet. Show the drawing she would get by tracing the moon with the quill pen. Also draw how the entire tool would look.



Include the answers to the following questions in your explanation. Use complete sentences!

- What do you call this type of transformation?
- What do you need to know in order to perform this motion?
- What could you call the original pen? The final pen?

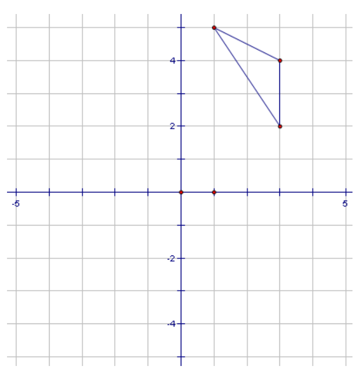
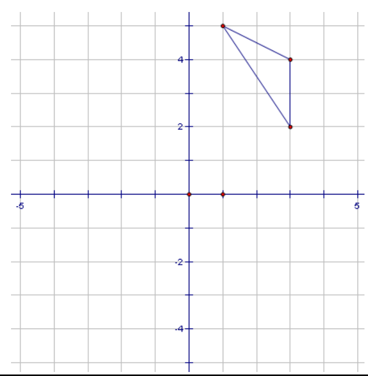
2. Bill rotates figure h using center V as shown by the arrow. Draw and label the image of figure h. Explain how you made your drawing.



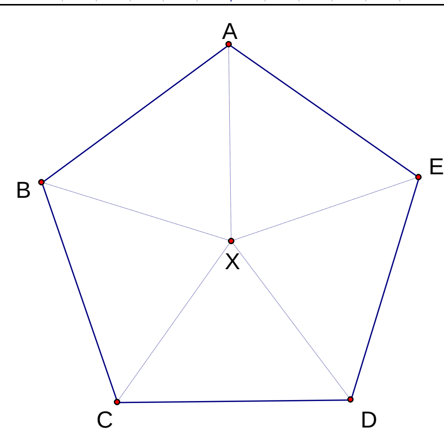
- What method did you use?
- What does the arrow tell you?
- What is point V? What happens to point V after the motion is performed?

Summary

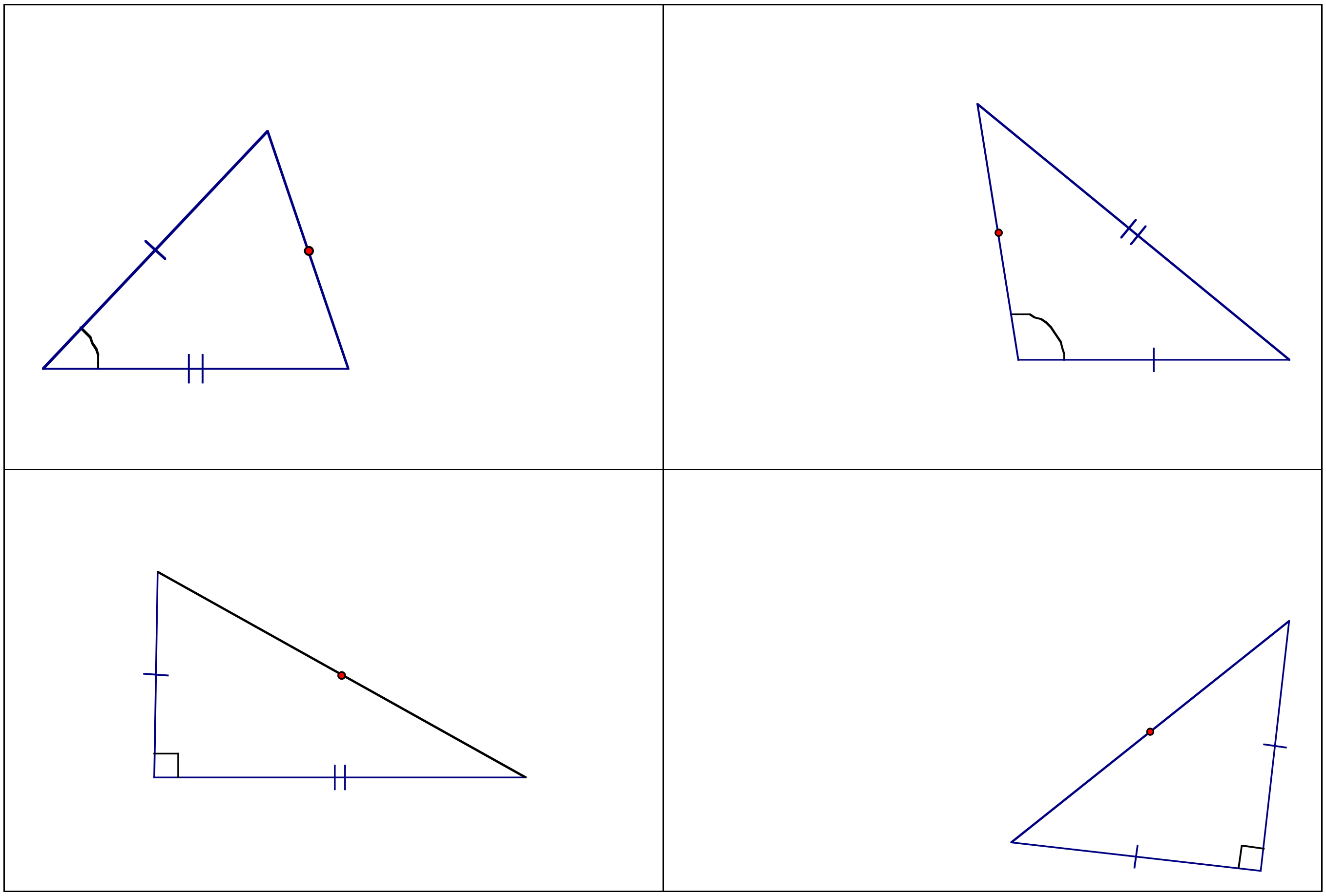
This type of transformation is called a __________________. To rotate an object, you must specify the _________________ of rotation, the ______________ around which the rotation is to occur, and the direction.

<table>
<tr>
<td>Perform a $90°$, counterclockwise rotation.
</td>
<td>Perform a $180°$, counterclockwise rotation.
</td>
</tr>
<tr>
<td>ABCDE is a regular pentagon. A regular polygon has all congruent angles and all congruent side lengths.

Name the image of point E for a counterclockwise $72°$ rotation about X.

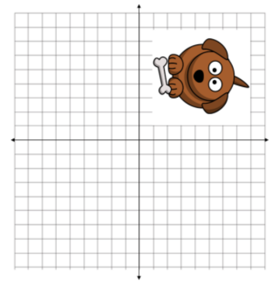
Name the image of point A for a clockwise $216°$ rotation about X.</td>
<td></td>
</tr>
</table>

Practice – Rotations - Use patty paper to rotate each figure 180 degrees around the given point.

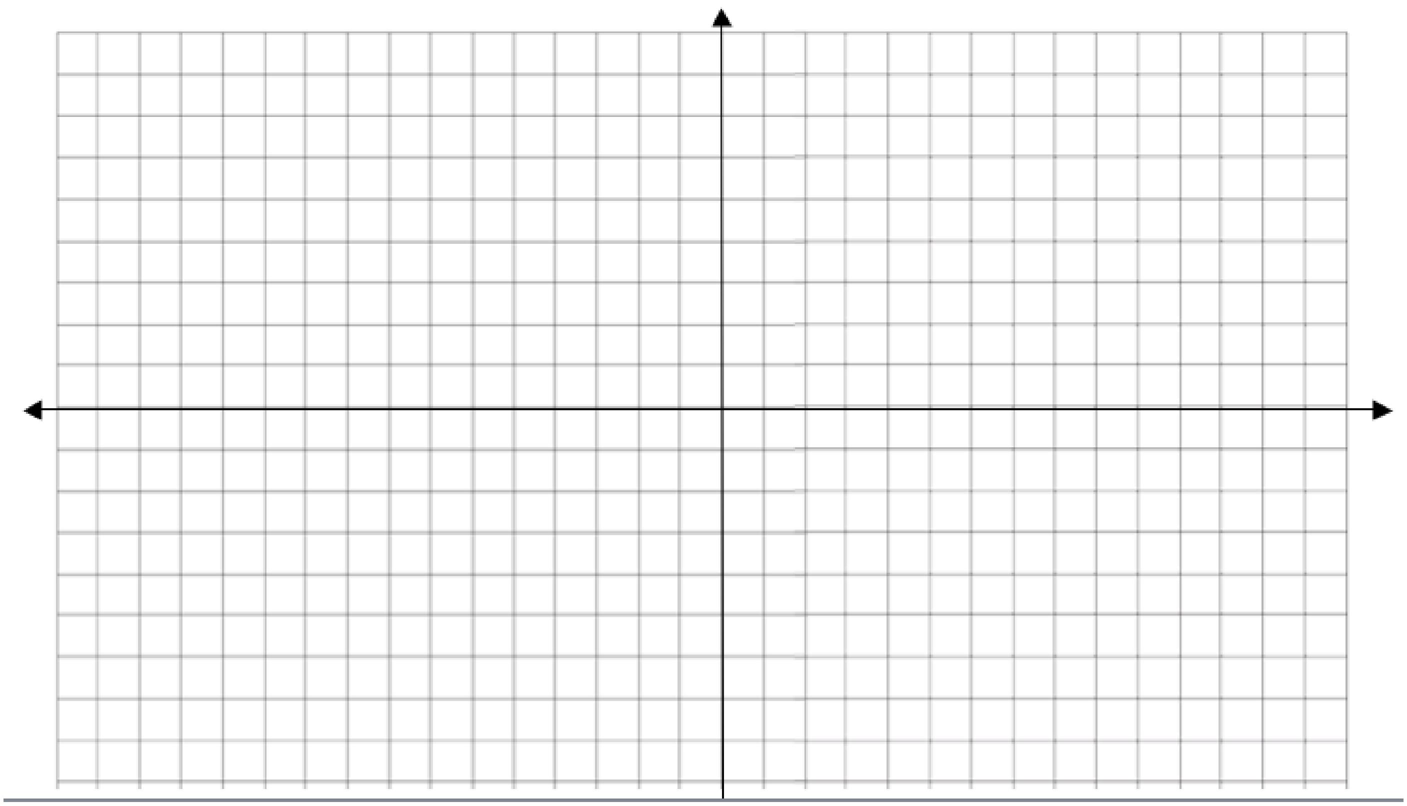


Rotations with Coordinates Discovery

3. Photo Rotation: As you are uploading your pictures on your computer, you notice that one of your pictures is not in the correct orientation (like shown to the right). You would like to rotate your photo so that your friends can view it.



Step 1: Draw your own original picture (something that symbolizes you) that fits into the first quadrant. You will draw your picture facing to the right (like shown).



Step 2: Pick 5 points on your original picture. Label these points A, B, C, D, and E. Write the coordinates of your pre-image points:

A (,)	B (,)	C (,)	D (,)	E (,)

Step 3: Using a sheet of patty paper, rotate your picture 90 degrees counterclockwise around the origin. Darken your image and your 5 image points. Write the coordinates of your image points:

A' (,)	B' (,)	C' (,)	D' (,)	E' (,)

Describe (in at least one complete sentence) what happened to the coordinates of x and y for each point:

____

Write a rule for a 90-degree counterclockwise rotation: ____

Step 4: Rewrite the coordinates of your pre-image points:

A (,)	B (,)	C (,)	D (,)	E (,)

Step 5: Using a sheet of patty paper, rotate your original picture 90 degrees clockwise around the origin. Darken your image and your 5 image points. Write the coordinates of your image points:

A' (,)	B' (,)	C' (,)	D' (,)	E' (,)

Describe (in at least one complete sentence) what happened to the coordinates of x and y for each point:

____

Write a rule for a 90-degree clockwise rotation: ____

Step 6: Rewrite the coordinates of your pre-image points:

A (,)	B (,)	C (,)	D (,)	E (,)

Step 7: Using a sheet of patty paper, rotate your picture 180 degrees (either counter-clockwise OR clockwise) around the origin. Darken your image and your 5 image points. Write the coordinates of your image points:

A' (,)	B' (,)	C' (,)	D' (,)	E' (,)

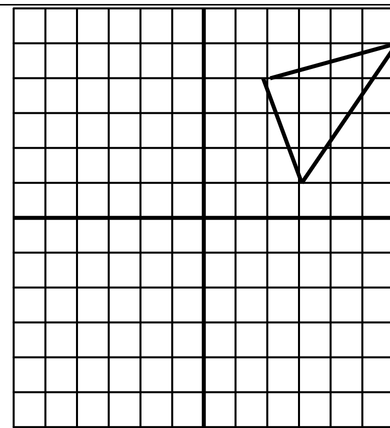
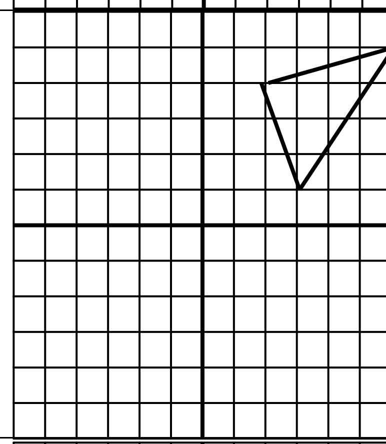
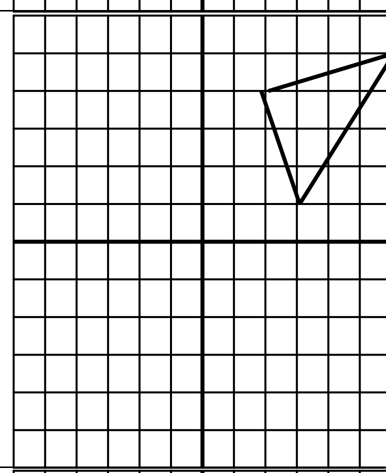
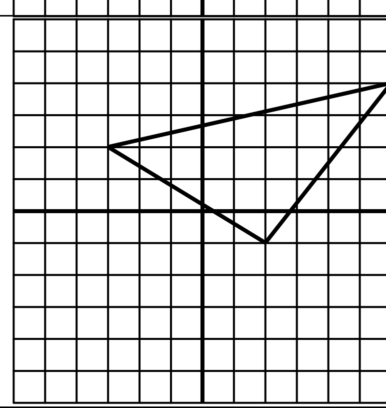
Describe (in at least one complete sentence) what happened to the coordinates of x and y for each point:

____

Write a rule for a 180-degree rotation: ____

Practice: Rotations with Coordinates

For each problem graph the image points. Specifically describe in words the rotation that occurred. Then, write the Algebraic Rule for the rotation.

1) The coordinates of △ABC are A(3, 1), B(6, 5) and C(2, 4). The coordinates of △A'B'C' are A'(-1, 3), B'(-5, 6), and C'(-4, 2).	
2) The coordinates of △ABC are A(3, 1), B(6, 5) and C(2, 4). The coordinates of △A'B'C' are A'(1, -3), B'(5, -6), and C'(4, -2).	
3) The coordinates of △ABC are A(3, 1), B(6, 5) and C(2, 4). The coordinates of △A'B'C' are A'(-3, -1), B'(-6, -5), and C'(-2, -4).	
4) The coordinates of △ABC are A(2, -1), B(6, 4) and C(-3, 2). The coordinates of △A'B'C' are A'(-1, -2), B'(4, -6), and C'(2, 3).	

Summarize with Algebraic Rules:

What type of transformation does each of the following algebraic rules produce?

$(x, y) \rightarrow (-y, x)$	$(x, y) \rightarrow (-x, -y)$
$(x, y) \rightarrow (y, -x)$	
Can you figure out this one on your own? Describe the rotation the results from the following algebraic rule $(x, y) \rightarrow (x, y)$	

Day 4: Dilations

Warm-Up: Given the line segment with points A(-1, 4) and B(2, 5) graph the image after the following transformations, identify the coordinates of the image, and write the Algebraic Rule for #1 & 2.

1) Reflect over the line y = x.

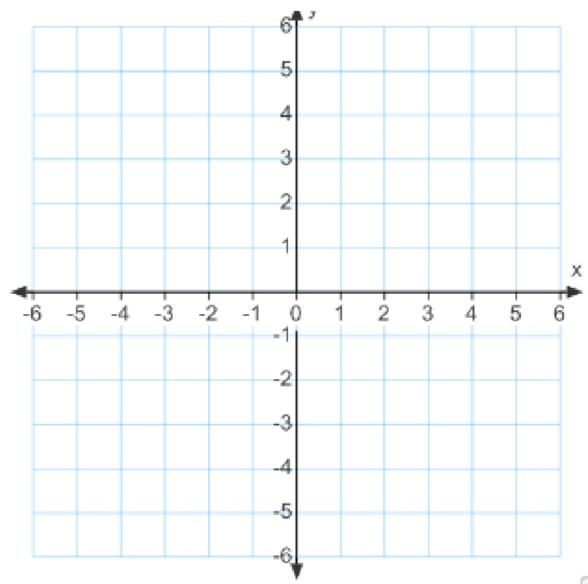
   Algebraic Rule:

2) Reflect over the line y = -x

   Algebraic Rule:

3) Reflect over the line y = 3.

4) Reflect over the line x = -1.



Dilations – Discovery Activity

Alice in Wonderland

In the story, Alice's Adventures in Wonderland, Alice changes size many times during her adventures. The changes occur when she drinks a potion or eats a cake. Problems occur throughout her adventures because Alice does not know when she will grow larger or smaller.

Part 1

As Alice goes through her adventure, she encounters the following potions and cakes:

Red potion – shrink by $\frac{1}{9}$

Blue potion – shrink by $\frac{1}{36}$

Green potion – shrink by $\frac{1}{15}$

Yellow potion – shrink by $\frac{1}{4}$

Chocolate cake – grow by 12 times

Red velvet cake – grow by 18 times

Carrot cake – grow by 9 times

Lemon cake – grow by 10 times

Find Alice's height after she drinks each potion or eats each bite of cake. If everything goes correctly, Alice will return to her normal height by the end.

Starting Height	Alice Eats or Drinks	Scale factor from above	New Height
54 inches	Red potion	$\frac{1}{9}$	6 inches
6 inches	Chocolate cake		
	Yellow potion		
	Carrot cake		
	Blue potion		
	Lemon cake		
	Green potion		
	Red velvet cake		

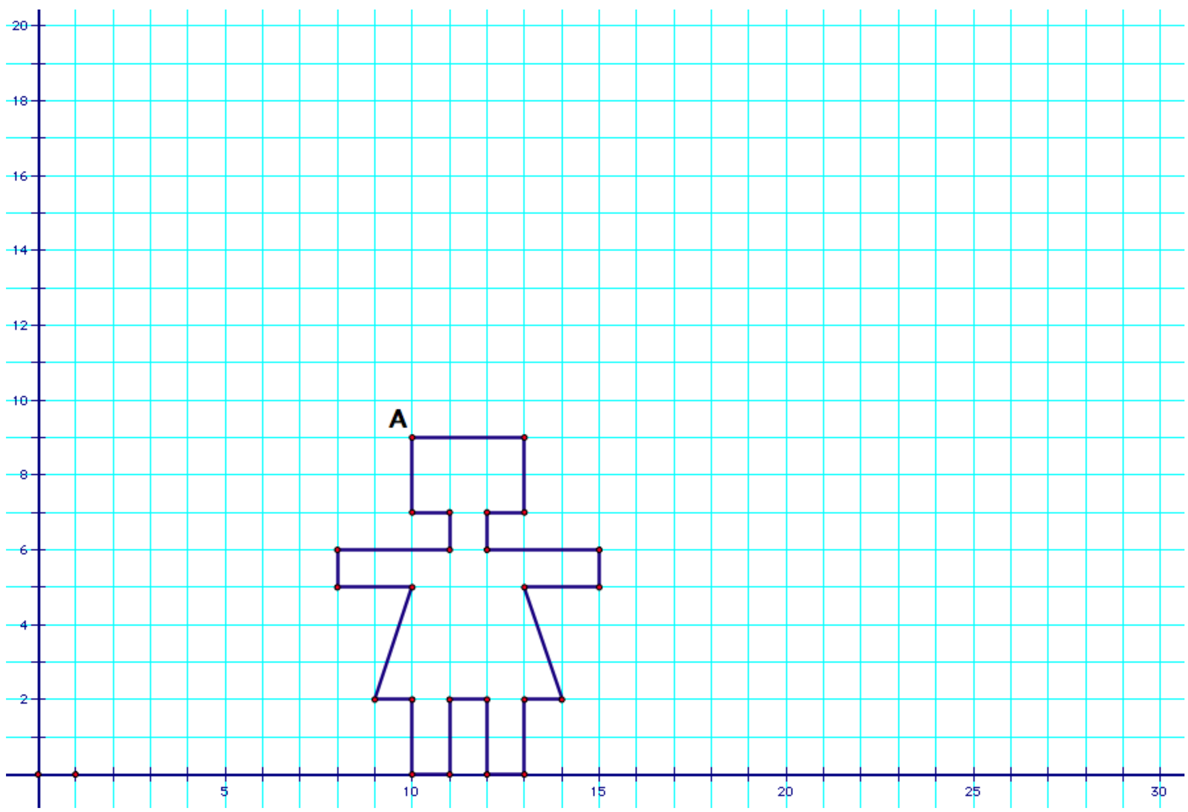
Part 2

A) The graph below shows Alice at her normal height.

B) Place a ruler so that it goes through the origin and point A. Plot point A' such that it is twice as far from the origin as point A. Do the same with all of the other points. Connect the points to show Alice after she has grown.

1. How many times larger is the new Alice? _______________________
2. How much farther away from the origin is the new Alice? ______________________
3. What are the coordinates for point A? ___________ Point A'? ___________
4. What arithmetic operation do you think happened to the coordinates of A?
5. Write your conjecture by completing the Algebraic Rule $x, y \rightarrow \quad ,$

C) Test your conjecture by looking at some of the other points and determining if their coordinates follow the same pattern.



D) What arithmetic operation on the coordinates do you think would shrink Alice in half?

E) Write your conjecture as an Algebraic rule.

F) If Alice shrinks in half, how far away from the origin will her image be from her preimage?

G) Draw the image of Alice if she is shrunk by a scale factor of ½ from her original height.

H) What would the Algebra Rule be if Alice is shrunk by a factor of ½ from her original height?

Summary: A dilation is

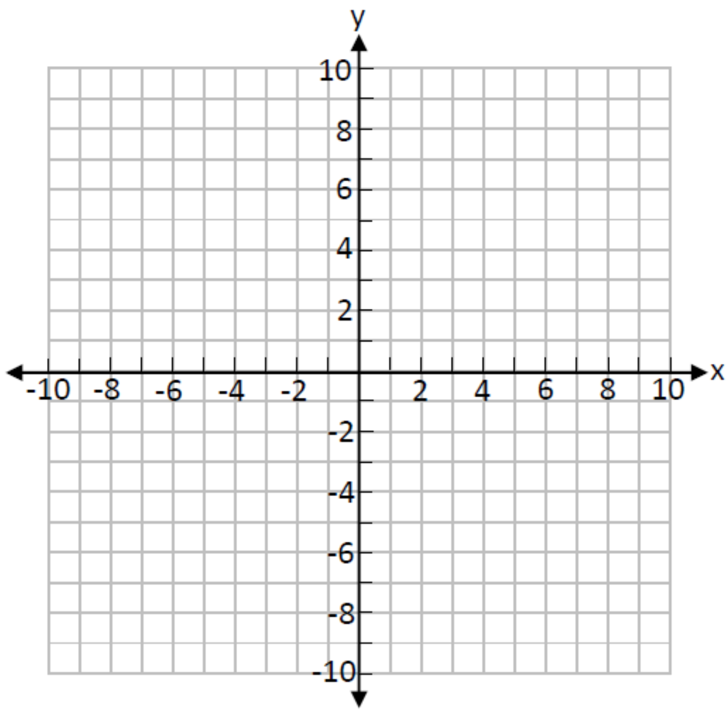
- an ______________ of the preimage if the ___________ is ______________________________.
- a ______________ of the preimage if the ___________ is ______________________________.
- If the scale factor is 1, then the preimage and image are _______________________.

Isometry: ____

A dilation ____________ an isometry

Practice: Day 4 Dilations Activity

1. Graph and connect these points: (2, 2) (3, 4) (5, 2) (5, 4).



2. Graph a new figure on the same coordinate plane by applying a scale factor of 2.
   What is the Algebraic Rule for this transformation? ___________________________
   How do the preimage and image compare? Describe the figure and the coordinate pairs.

3. Graph a new figure on the same coordinate plane by applying a scale factor of 1/2.
   What is the Algebraic Rule for this transformation? ___________________________
   Compare the preimage to the dilated figure. Describe the figure and the coordinate pairs.

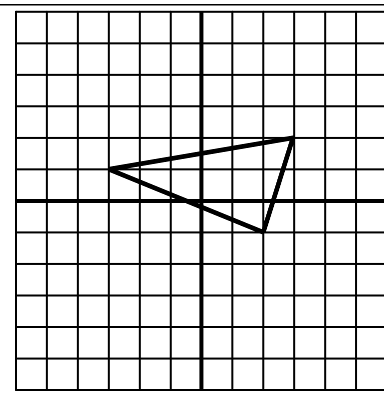
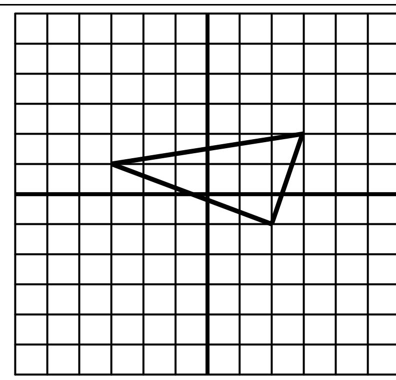
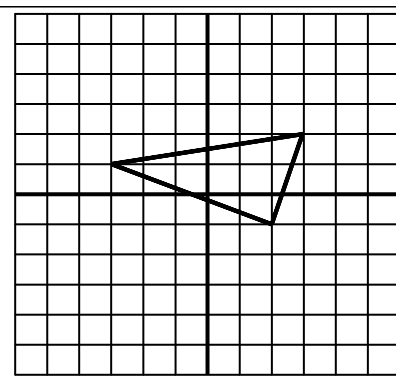
4. What happens when you apply a scale factor greater than 1 to a set of coordinates?

5. What happens when you apply a scale factor less than 1 to a set of coordinates?

6. What happens when you apply a scale factor of 1 to a set of coordinates?

Practice: Dilations with Coordinates

For each problem, graph the image points, and describe the transformation that occurred. Specify if the transformation is an enlargement or reduction and by what scale factor. Then, examine the coordinates to create an Algebraic Rule.

1) The coordinates of △ABC are A(2, -1), B(3, 2) and C(-3, 1). The coordinates of △A'B'C' are A'(1, -1/2), B'(3/2, 1), and C'(-3/2, 1/2).	
2) The coordinates of △ABC are A(2, -1), B(3, 2) and C(-3, 1). The coordinates of △A'B'C' are A'(4, -2), B'(6, 4), and C'(-6, 2).	
3) The coordinates of △ABC are A(2, -1), B(3, 2) and C(-3, 1). The coordinates of △A'B'C' are A'(3, -3/2), B'(9/2, 3), and C'(-9/2, 3/2).	

Summarize with Algebraic Rules:

What type of transformation does the following algebraic rule produce?

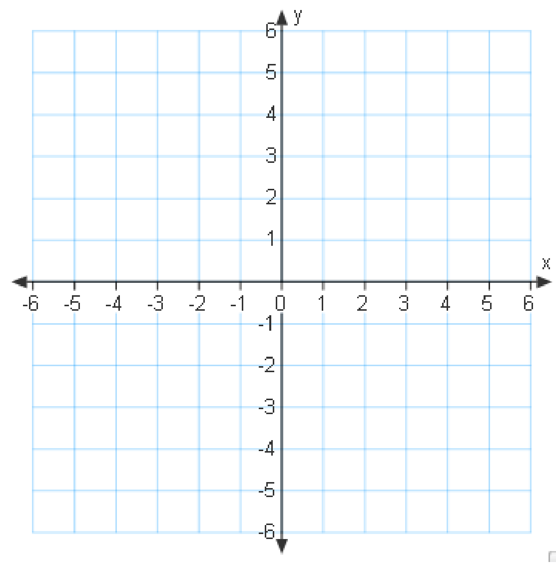
$(x, y) \rightarrow (ax, ay)$

if $a > 1$ then________________________

if $0 < a < 1$ then________________________

Day 5: Compositions

Warm-Up: Given triangle GHI with G(-2, 1), H(3, 4), and I(1, 5), find the points of the image under the following transformations and write the Algebraic Rule.



1) Translate right 2, down 3

2) Reflect over the x-axis

3) Rotate 90 degrees, counter-clockwise

4) Dilate with a scale factor of 3

Compositions

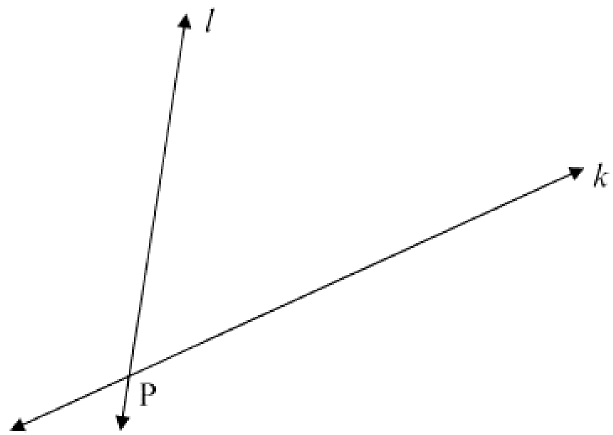
Part 1 - Reflections over Two Parallel Lines

a. On a blank piece of paper, draw two parallel lines and label them ***l*** and **k**, similar to the diagram shown.

b. To the left of line l, draw a small polygon. Label the vertices A, B, C, etc.
c. Using patty paper, folding, or your own method, reflect your polygon over line l. Label the corresponding image A', etc.
d. Reflect you polygon from the last step over line k. Label the resulting image A", B", etc.
e. Draw a segment connecting vertices A and A". Draw a segment connecting B and B". Draw a segment connecting C and C". Compare the lengths of the three segments.
f. How do the sizes and relative positions of the original polygon and the last image compare?
g. Describe a single transformation that would map the original polygon to the last image polygon.

Part 2 - Reflections over Two Intersecting Lines

a. On a piece of paper, draw lines l and k like the diagram shown. They should intersect at point P.



b. To the left of line l, draw and label a small polygon. Label the vertices A, B, C, etc.
c. Using patty paper, folding, or your own method, reflect your polygon over line l. Label the corresponding image A', etc.
d. Reflect you polygon from the last step over line k. Label the resulting image A", B", etc.
e. Draw a segment connecting vertices A and A". Draw a segment connecting B and B". Draw a segment connecting C and C". Compare the lengths of the three segments.
f. How do the sizes and relative positions of the original polygon and the last image compare?
g. Describe a single transformation that would map the original polygon to the last image polygon.

Summary

A _______________ is a sequence of ____.

Two reflections across ___________ lines is the same as a ____________________________.

A _____________ is the same as a double reflection around ________________ lines.

The point of rotation is the _______________ of the ________ __________ _______.

Same Orientation: Facing the __________ _____________________.

TIP to check: If vertices are labeled alphabetically with ABC and A'B'C', read them in alphabetical order. They should read both ____________________ or both ____________________________.

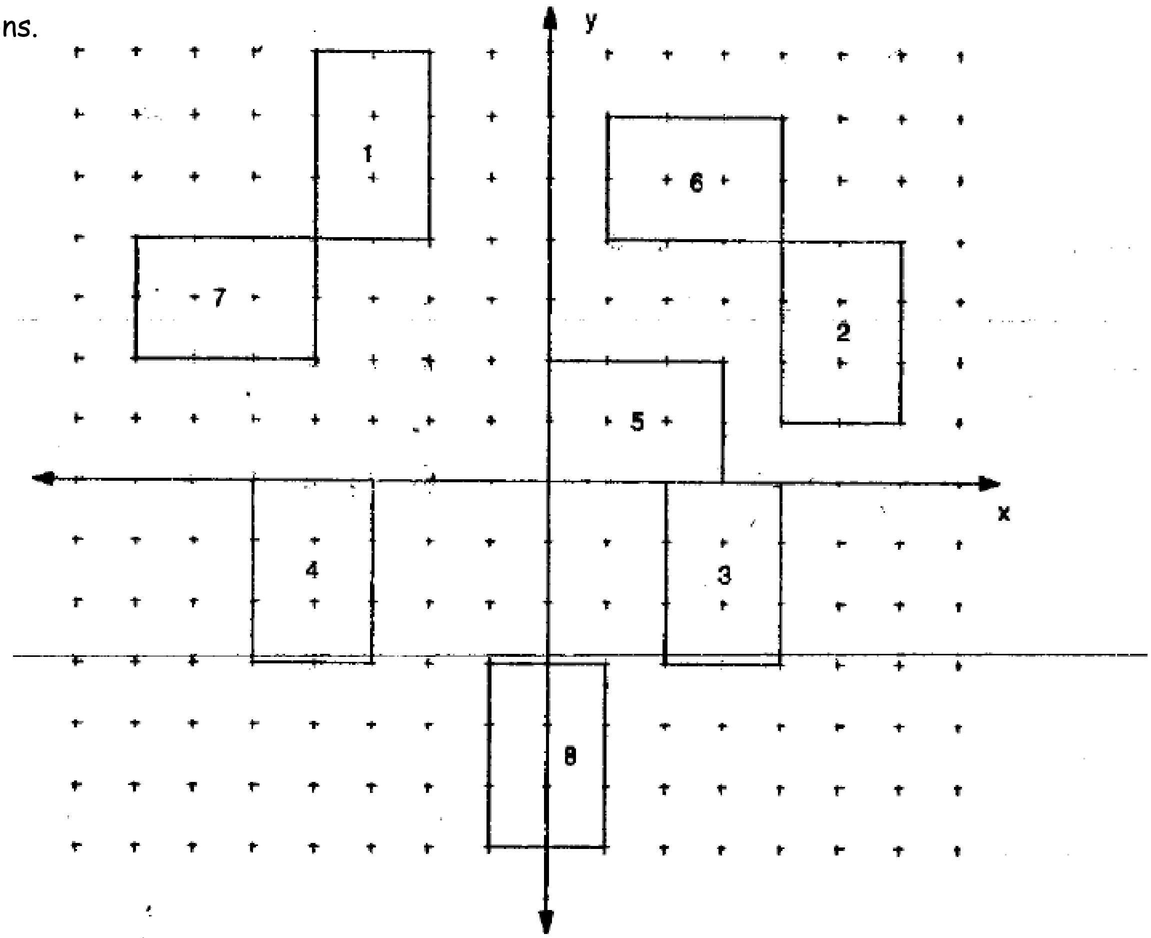
Opposite Orientation: Facing the ____________ _______________________.

TIP to check: If vertices are labeled alphabetically with ABC and A'B'C', read them in alphabetical order. They should read one _____________________ and one ___________________________.

Orientation can be helpful in describing and ____________________ transformations.

Practice 1: Compositions of Transformations with Coordinates

All of the rectangles are congruent. For each problem, start with the rectangle indicated. Then perform compositions of transformations specified. Perform the transformations in the order specified, one after the other. Determine which rectangle you land on after performing the transformations.



1. Reflect figure 1 over the y-axis. Translate it three units down then rotate it 90° counter-clockwise around (3,1). Which figure does figure 1 now match? **Answer: figure 5**
2. Translate figure 2 one unit down. Reflect it over the x-axis then reflect it over the line x = 4. Which figure does figure 2 now match?
3. Reflect figure 3 over the y-axis. Rotate 90° clockwise around (-2, 0) then glide 5 units to the right. Which figure does figure 3 now match?
4. Rotate figure 4 90° clockwise around (-3,0). Then reflect over the line y =2 then translate one unit to the left. Which figure does figure 4 now match?
5. Translate figure 5 five units to the left. Then rotate 90° clockwise around (-2,2). Then translate up two spaces. Which figure does figure 5 now match?
6. Rotate figure 6 90° clockwise around (4,4) then translate three units down. Which figure does figure 6 now match?
7. Rotate figure 7 90° clockwise around (-4,4) then reflect over the line x = -4. Which figure does figure 7 now match?
8. Reflect figure 8 over the x-axis. Then translate four units to the left. Then reflect over the line y = 1.5 Which figure does figure 8 now match?

Practice 2: Composition of Motions with Algebraic Rules

For each problem, there is a composition of motions listed. Write algebraic rules for each of the transformations. Then, determine a single algebraic rule that would accomplish the same motion with a single transformation.

1) Translate the triangle 4 units right and 2 units up, and then reflect the triangle over the line y=x.

2) Rotate the triangle 90 degrees counter clockwise, and then dilate the figure by a scale factor of 3.

3) Translate the triangle 4 units left and 2 units down, and then reflect the triangle over the y-axis.

4) Rotate the triangle 90 degrees clockwise, and then dilate the figure by a scale factor of 1/3.

5) Translate the triangle 4 units right and 2 units down, and then reflect the triangle over the x-axis.

6) Rotate the triangle 180 degrees counter clockwise, and then dilate the figure by a scale factor of 2.

7) Translate the triangle 4 units left and 2 units up, and then reflect the triangle over the line y=x.

8) Rotate the triangle 180 degrees clockwise, and then dilate the figure by a scale factor of 1/2.

Day 6: Review of Transformations; Review of Ratios and Proportions

Warm-Up/Some Review for the quiz:

Given the points C (3, 2), A (-5, 4), and T (-1, 6), name the new points after the following transformations. Then, describe the transformation.

1) $(x, y) \longrightarrow (-x, y)$

2) $(x, y) \longrightarrow (y, -x)$

3) $(x, y) \longrightarrow (x + 1, y - 3)$

4) $(x, y) \longrightarrow (3x, 3y)$

Similarity

Discovery: Using graph paper, rulers and protractors

1. Draw a line segment.
2. Select a point not on the line for the center of dilation.
3. Extend a ray from the center of dilation through each endpoint of the segment.
4. Choose scale factor that will double the size of the segment (*k* = 2).
5. Determine the lengths of the segments from the center to each endpoint along each ray.
6. Multiply the lengths by the scale factor to determine the dilated distance.
7. Measure the dilated distance along the appropriate ray from the center to the new endpoint.
8. Connect the dilated endpoints.
9. Determine the lengths of the original and dilated segments.
10. Measure the corresponding angles formed by the intersection of the ray, original segment, and dilated segment.
11. Verify the following properties associated with similar figures:
    a. The dilated distance is twice as large as the original distance.
    b. Corresponding angles are congruent.
    c. The distance along the ray from the center to the dilated endpoint is twice as large as the distance from the center to the original endpoint.
12. Without creating a dilation describe the how the properties of dilation would effect a size change with a scale factor less than 1 (*k = 0.75).*

Summary:

Two figures are similar (~) if they have the same _______________ but not necessarily the same _____________.

The ______________ _____________ is the ratio of the lengths of the corresponding sides.

Two figures are congruent $\cong$ if they are similar and ____.

Two polygons are similar if:

1) Corresponding ________ are ___________ AND 2) Corresponding _________ are _____________

Two TRIANGLES are similar if ____

Day 7: Similarity

Warm-Up: Given triangle CDE with C(2, 2), D(-6, 4), and E(-2, -6), write the points of the image under the following transformations.

1) $x, y \rightarrow 2x, 2y$
2) $x, y \rightarrow \frac{1}{2}x, \frac{1}{2}y$
3) Dilation with scale factor 3
4) Horizontal stretch with scale factor 1/3, vertical shrink with scale factor 1/3

Similar Figures

Definition	Characteristics
Similar Figures	
Examples	Non-Examples

Venn Diagram

1) A 6 ft tall tent standing next to a cardboard box casts a 9 ft shadow. If the cardboard box casts a shadow that is 6 ft long then how tall is it?

2) A telephone booth that is 8 ft tall casts a shadow that is 4 ft long. Find the height of a lawn ornament that casts a 2 ft shadow.

3) A map has a scale of 3 cm : 18 km. If Riverside and Smithville are 54 km apart then they are how far apart on the map?

4) Find the distance between Riverside and Milton if they are 12 cm apart on a map with a scale of 4 cm : 21 km.

You Try!!

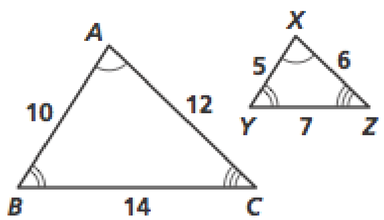
7) A map has a scale of 2 in : 6 mi. If Clayton and Centerville are 10 in apart on the map then how far apart are the real cities?

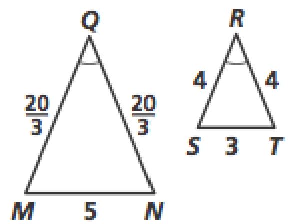
8) A statue that is 12 ft tall casts a shadow that is 15 ft long. Find the length of the shadow that a 8 ft cardboard box casts.

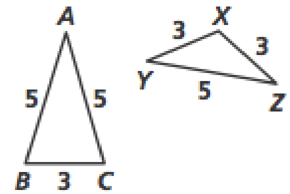
Practice 8-2

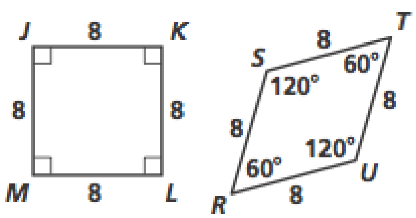
Similar Polygons

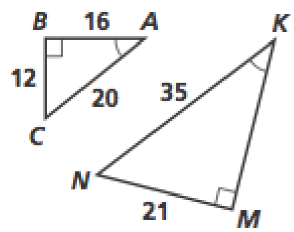
Are the polygons similar? If they are, write a similarity statement, and give the similarity ratio. If they are not, explain.

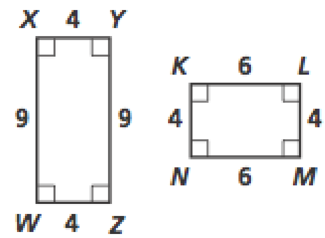
1. 

2. 

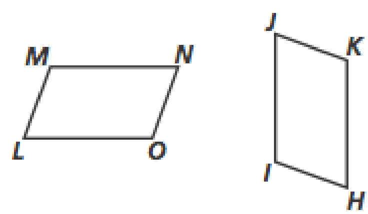
3. 

4. 

5. 

6. 

***LMNO* ~ *HIJK*. Complete the proportions and congruence statements.**



7. $\angle M \cong ?$

8. $\angle K \cong ?$

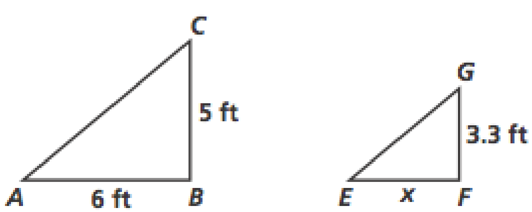
9. $\angle N \cong ?$

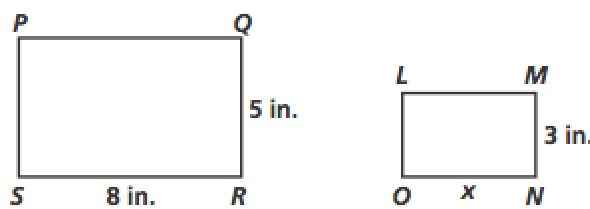
10. $\frac{MN}{IJ} = \frac{?}{JK}$

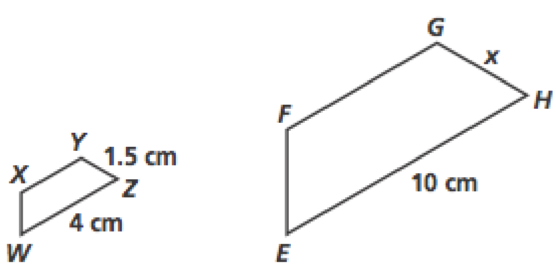
11. $\frac{HK}{?} = \frac{HI}{LM}$

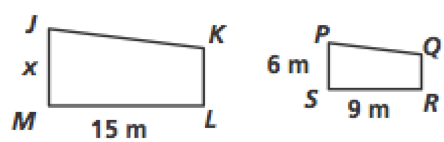
12. $\frac{IJ}{MN} = \frac{HK}{?}$

***Algebra* The polygons are similar. Find the values of the variables.**

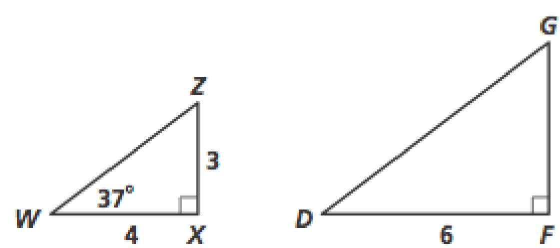
13. 

14. 

15. 

16. 

$\triangle WXZ \sim \triangle DFG$. Use the diagram to find the following.



17. the similarity ratio of $\triangle WXZ$ and $\triangle DFG$

18. $m\angle Z$

19. DG

20. GF

21. $m\angle G$

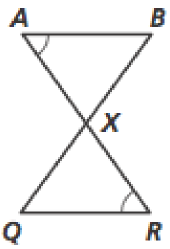
22. $m\angle D$

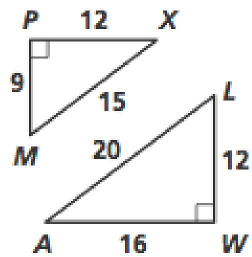
23. WZ

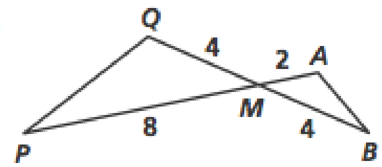
Practice 8-3

Proving Triangles Similar

Explain why the triangles are similar. Write a similarity statement for each pair.

1.


2.


3.


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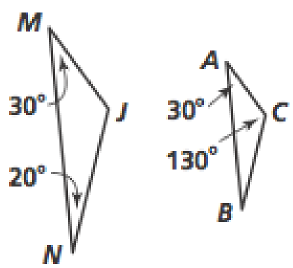

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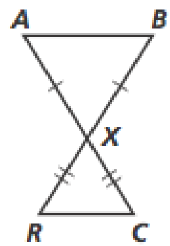
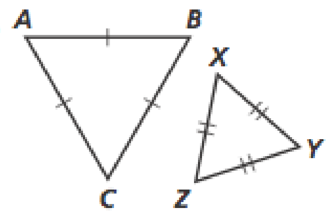
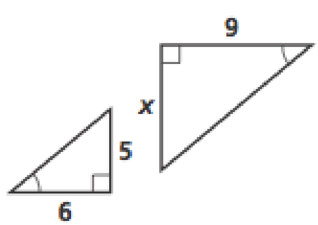
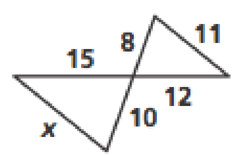
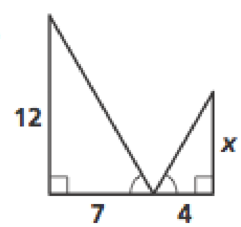


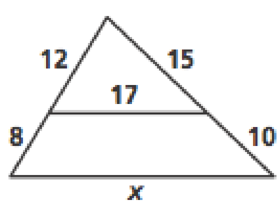
6.


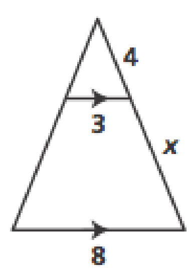
Algebra **Find the value of** ***x*****.**

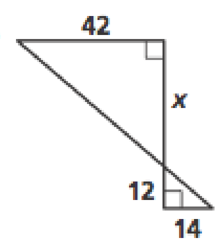
7.


8.


9.


10.


11.


12.


13. Natasha places a mirror on the ground 24 ft from the base of an oak tree. She walks backward until she can see the top of the tree in the middle of the mirror. At that point, Natasha's eyes are 5.5 ft above the ground, and her feet are 4 ft from the image in the mirror. Find the height of the oak tree.