Name: **Transformations, Congruence, and Constructions** | **6.1**

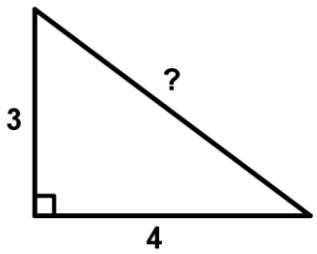
Ready, Set, Go!

Ready

Topic: Pythagorean Theorem

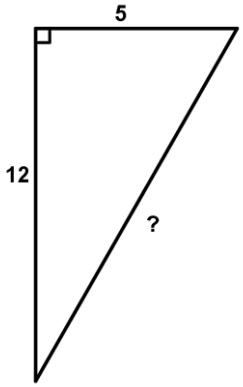
For each of the following right triangles determine the number unit measure for the missing side.

1.



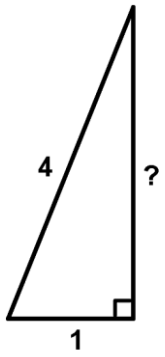
5

2.



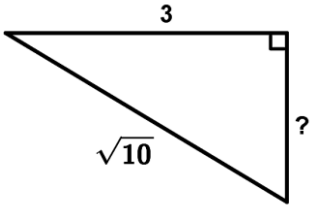
13

3.



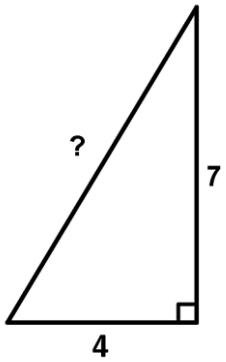
$\sqrt{15}$

4.



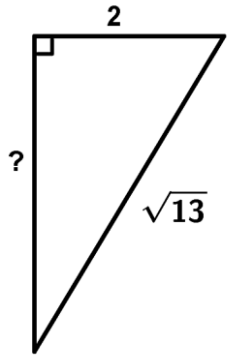
1

5.



$\sqrt{65}$

6.



3

Set

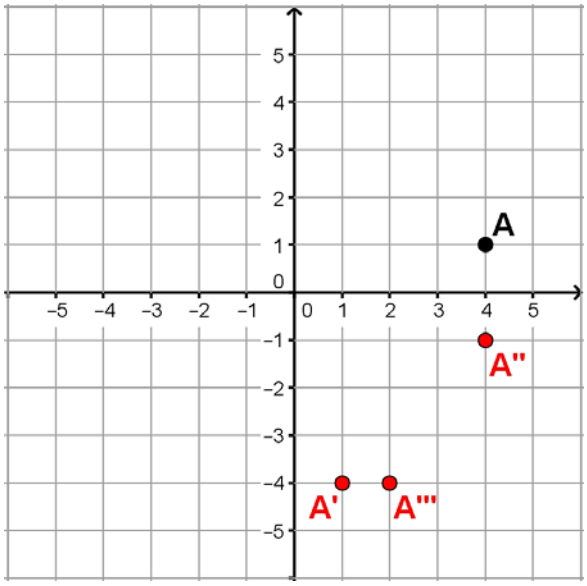
Topic: Transformations

Transform points as indicated in each exercise below.

7. a. Rotate point A around the origin $-90°$ (clockwise), label as A'

   b. Reflect point A over the x-axis, label as A"

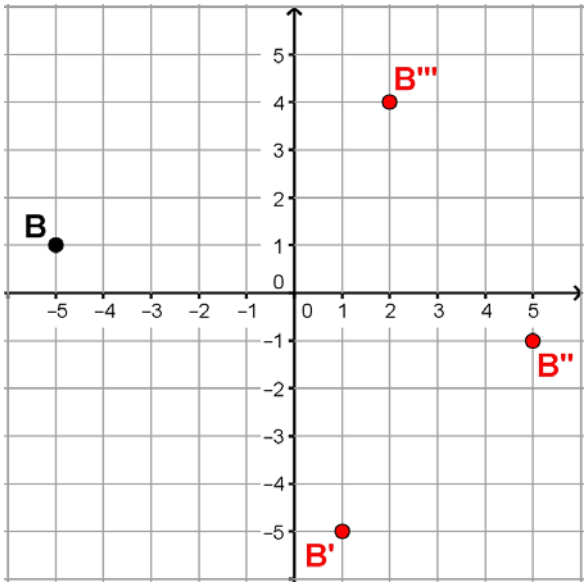
   c. Apply the rule $(x-2, y-5)$, to point A and label A"'



8. a. Reflect point B over the line $y = x$, label as B'

   b. Rotate point B 180° about the origin, label as B"

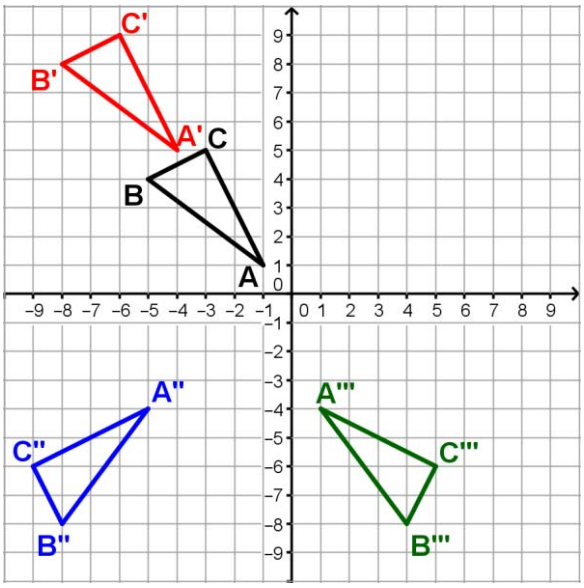
   c. Translate point B the point up 3 and right 7 units, label as B"'



9. a. Translate ΔABC left 3 units and up 4 units, label as $\Delta A'B'C'$.

   b. Rotate $\Delta A'B'C'$ 90° (counter clockwise) about the origin. Label as $\Delta A''B''C''$.

   c. Reflect $\Delta A''B''C''$ over the line $x = -2$. Label as $\Delta A'''B'''C'''$.

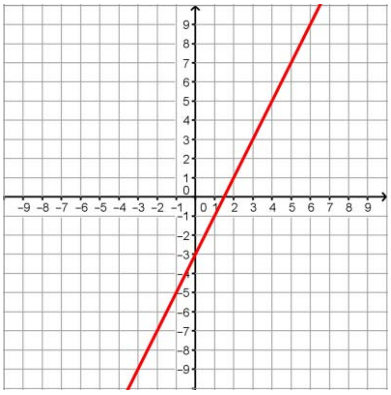


Go

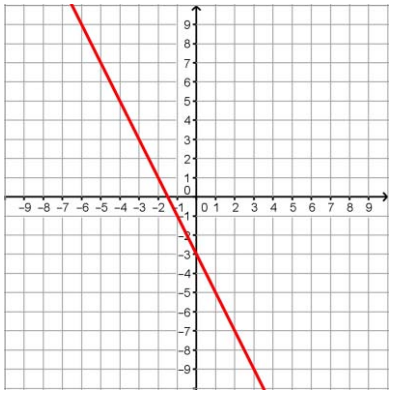
Topic: Graphing linear equations

Graph each equation on the coordinate grid provided. Extend the line as far as the grid will allow.

10. $y = 2x - 3$



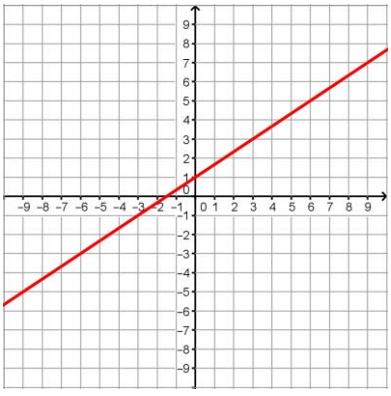
11. $y = -2x - 3$



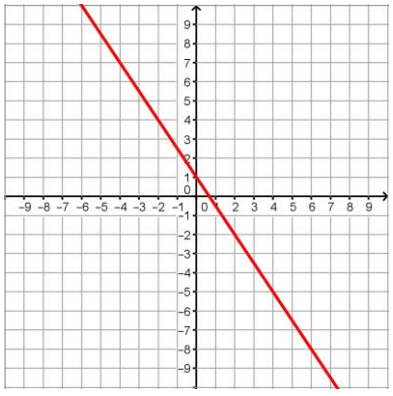
12. What similarities and difference are there between the equations in number 10 and 11?

Same *y*-intercept, opposite slopes

13. $y = \frac{2}{3}x + 1$



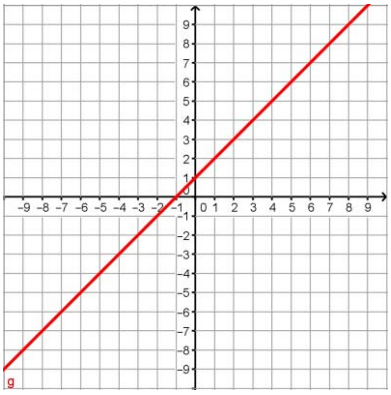
14. $y = -\frac{3}{2}x + 1$



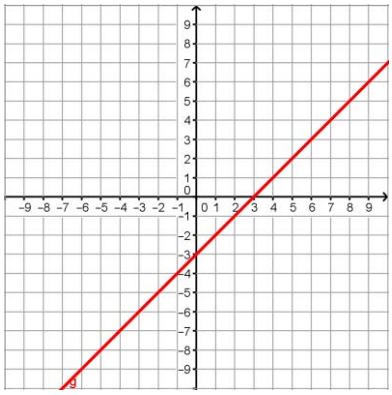
15. What similarities and difference are there between the equations in number 13 and 14?

Same *y*-intercept, opposite reciprocal slopes

16. $y = x + 1$



17. $y = x - 3$



18. What similarities and difference are there between the equations in number 16 and 17?

Same slopes, different *y*-intercepts

Name: **Transformations, Congruence, and Constructions** **6.2**

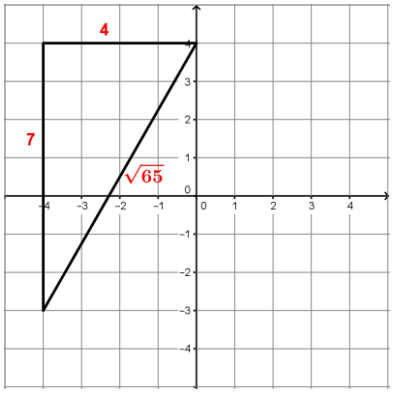
Ready, Set, Go!

Ready

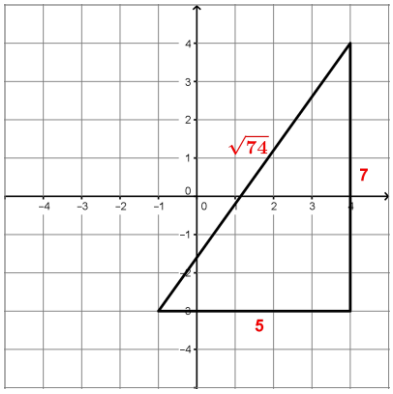
Topic: Finding distance using Pythagorean Theorem

Use the coordinate grid to find the length of each side of the triangles provided.

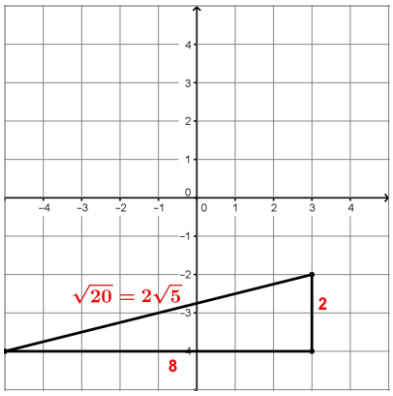
1.



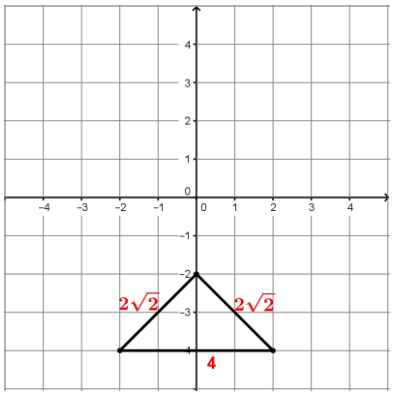
2.



3.



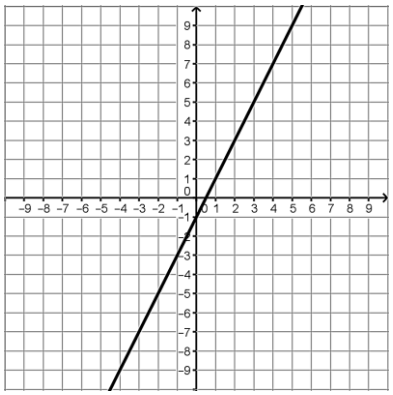
4.



Set

Topic: Slopes of parallel and perpendicular lines.

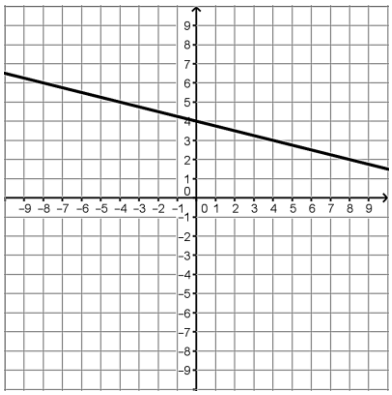
5. Graph a line *parallel* to the given line.



Equation for given line:
$y = 2x - 2$

Equation for *new* line:
Answers vary

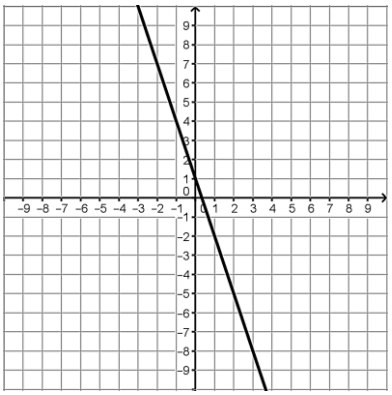
6. Graph a line *parallel* to the given line.



Equation for given line:
$y = -\frac{1}{4}x + 4$

Equation for *new* line:
Answers vary

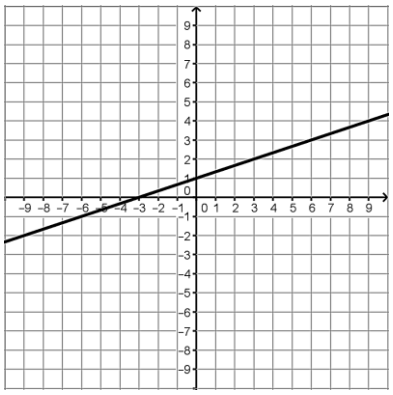
7. Graph a line *parallel* to the given line.



Equation for given line:
$y = -3x + 1$

Equation for *new* line:
Answers vary

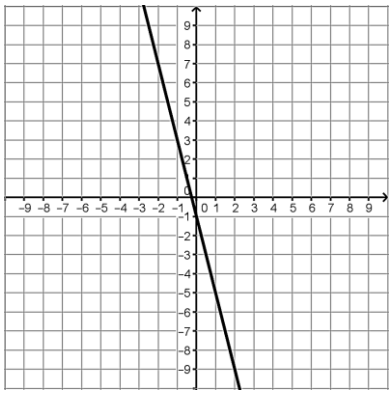
8. Graph a line *perpendicular* to the given line.



Equation for given line:
$y = \frac{1}{3}x + 1$

Equation for *new* line:
Answers vary

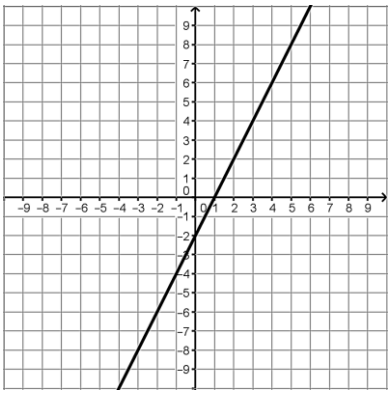
9. Graph a line *perpendicular* to the given line.



Equation for given line:
$y = -4x - 1$

Equation for *new* line:
Answers vary

10. Graph a line *perpendicular* to the given line.



Equation for given line:
$y = 2x - 2$

Equation for *new* line:
Answers vary

Go

Topic: Solve equations

Solve each equation for the indicated variable.

11. $3(x-2)=5x+8$; Solve for x.

$x=-7$

12. $-3+n=6n+22$; Solve for n.

$n=-5$

13. $y-5=m(x-2)$; Solve for x.

$x=\frac{y-5}{m}+2$

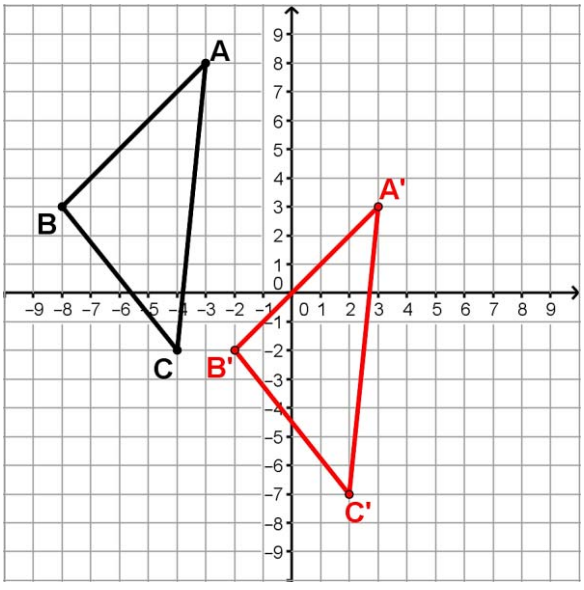
14. $Ax+By=C$; Solve for y.

$y=\frac{C-Ax}{B}$

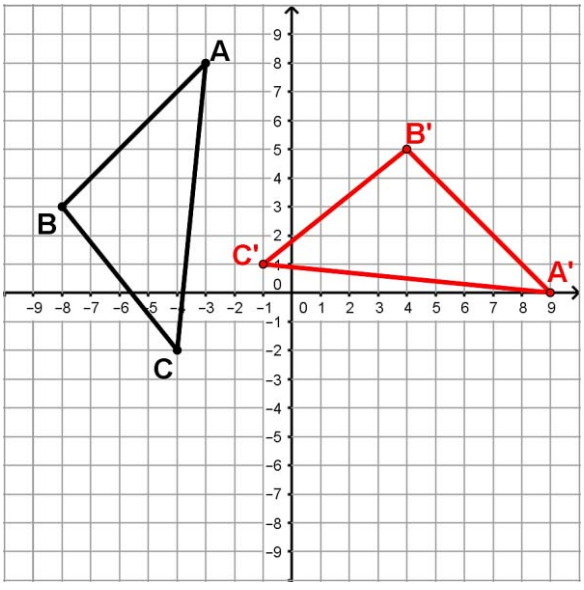
Topic: Transformations

Perform each transformation.

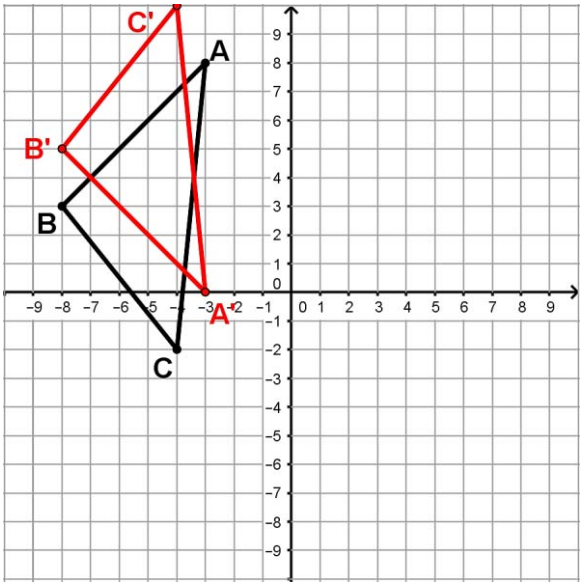
15. Translate the triangle according to the rule $(x+6, y-5)$.



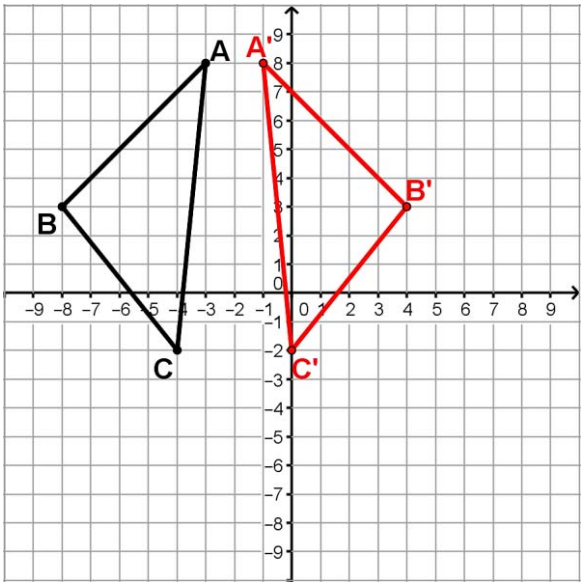
16. Rotate the triangle $-90°$ clockwise, about the point $(-1,-2)$.



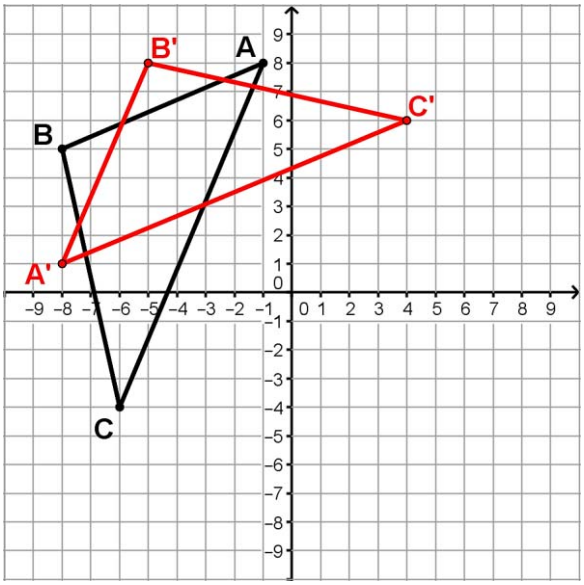
17. Reflect the triangle over the line $y = 4$.



18. Reflect the triangle over the line $x = -2$.



19. Reflect the triangle over the line $y = -x$.



Name: **Transformations, Congruence, and Constructions** | **6.3**

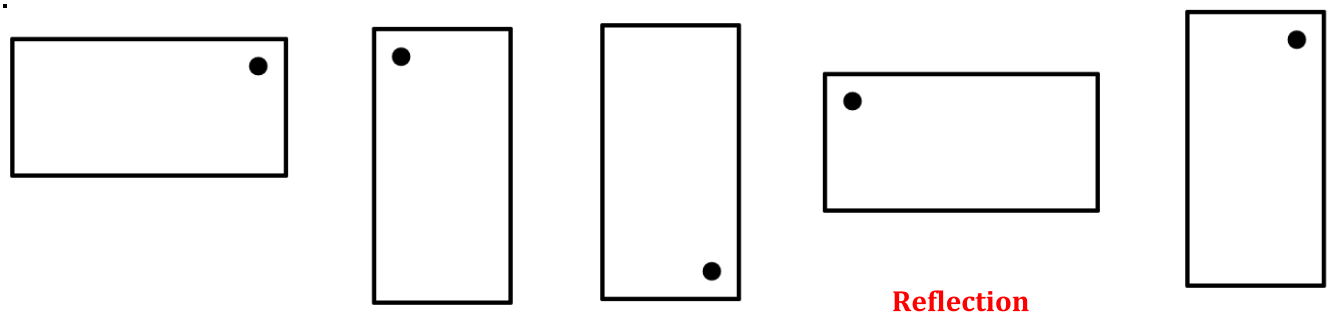
Ready, Set, Go!

Ready

Topic: Basic rotations and reflections of objects

In each problem there will be a pre-image and several images based on the given pre-image. Determine which of the images are rotations of the given pre-image and which of them are reflections of the pre-image. If an image appears to be created as the result of a rotation and a reflection then state both.

1.



Pre-Image

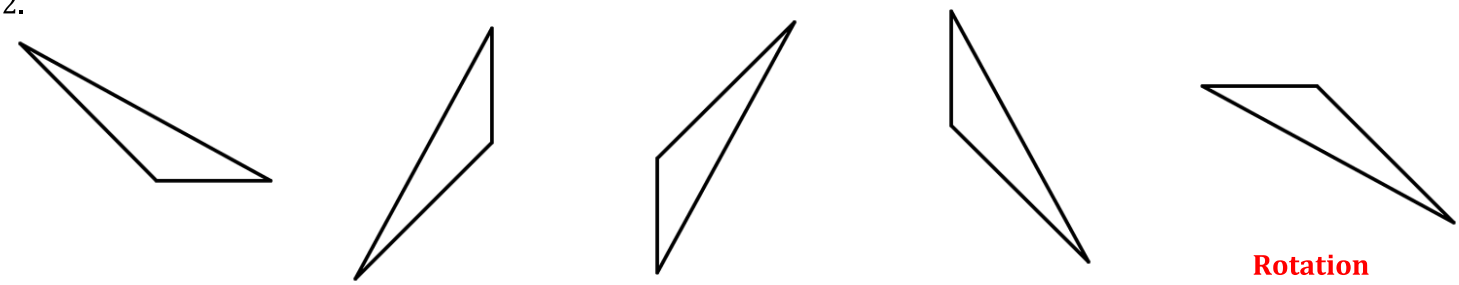
Image A — **Rotation**

Image B — **Rotation**

Image C — **Reflection**

Image D — **Rotation & Reflection**

2.



Pre-Image

Image A — **Rotation**

Image B — **Rotation**

Image C — **Rotation & Reflection**

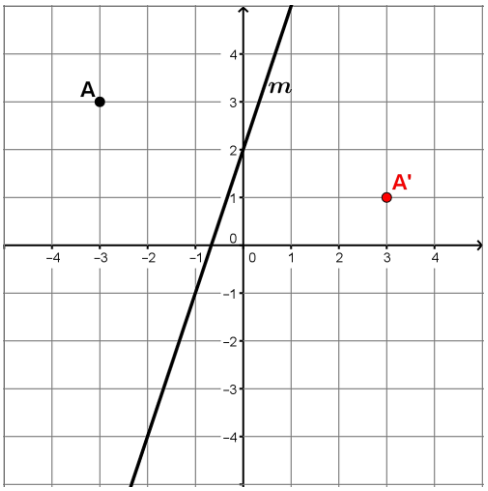
Image D — **Rotation**

Set

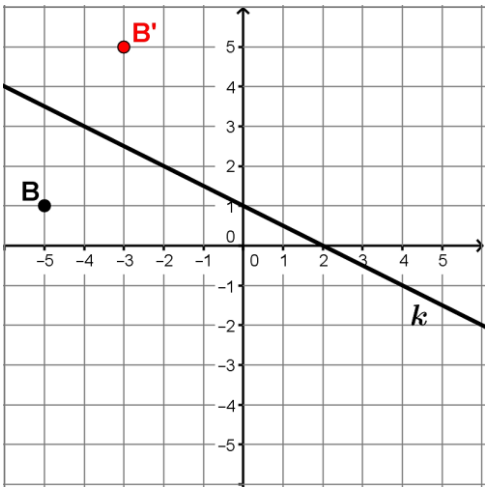
Topic: Reflecting and rotating points

On each of the coordinate grids there is a labeled point and line. Use the line as a line of reflection to reflect the given point and create its reflected image over the line of reflection.

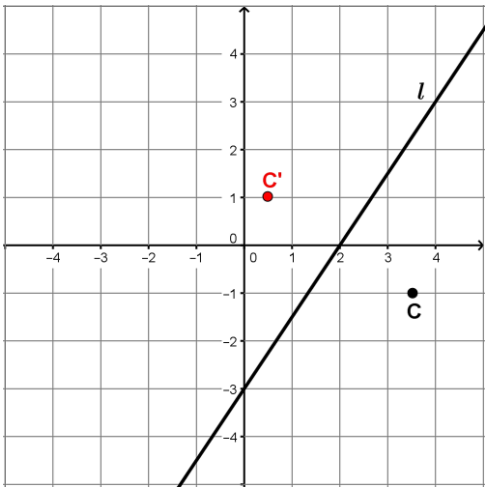
3. Reflect point ***A*** over line ***m*** and label the image ***A'***



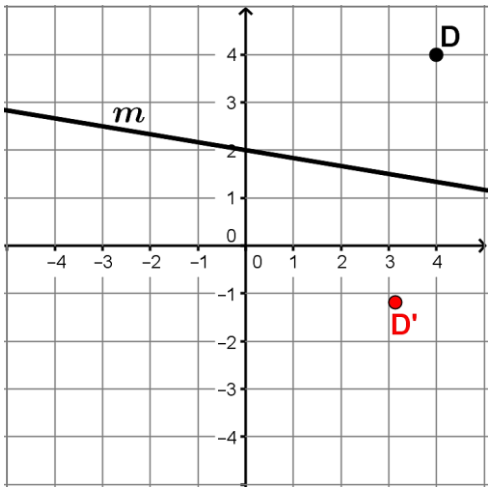
4. Reflect point ***B*** over line ***k*** and label the image ***B'***



5. Reflect point ***C*** over line ***l*** and label the image ***C'***

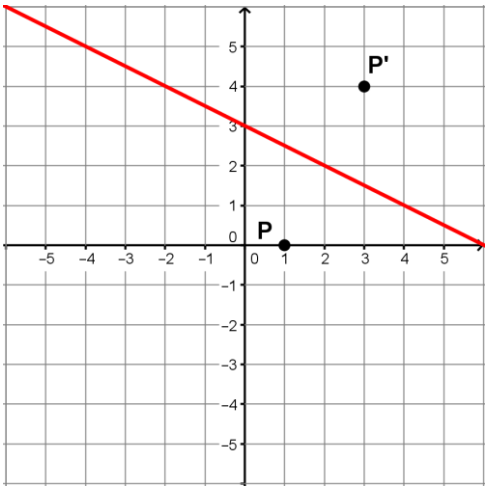


6. Reflect point ***D*** over line ***m*** and label the image ***D'***



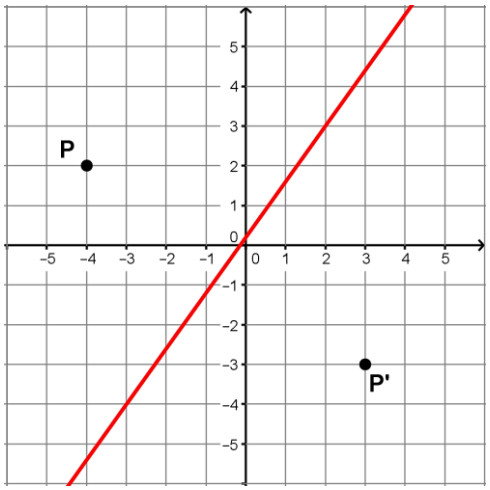
For each pair of points, *P* and *P'*, draw in the line of reflection that would need to be used to reflect *P* onto *P'*. Then find the equation of the line of reflection.

7.



Equation: $y = -\frac{1}{2}x + 3$

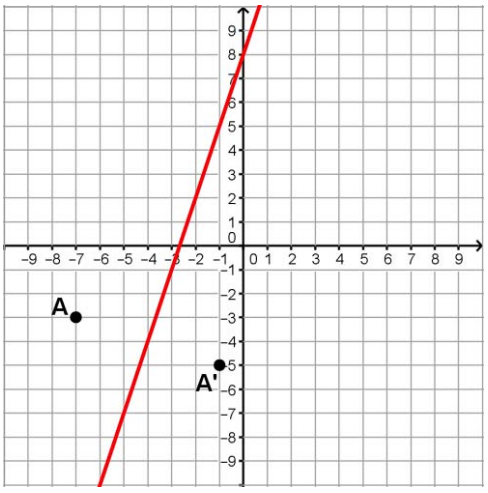
8.



Equation: $y = \frac{7}{5}x + \frac{1}{5}$

For each pair of point, *A* and *A'*, draw in the line of reflection that would need to be used to reflect *A* onto *A'*. Then find the equation of the line of reflection. Also, draw a line connecting *A* to *A'* and find the equation of this line. Compare the slopes of the lines of reflection containing *A* and *A'*.

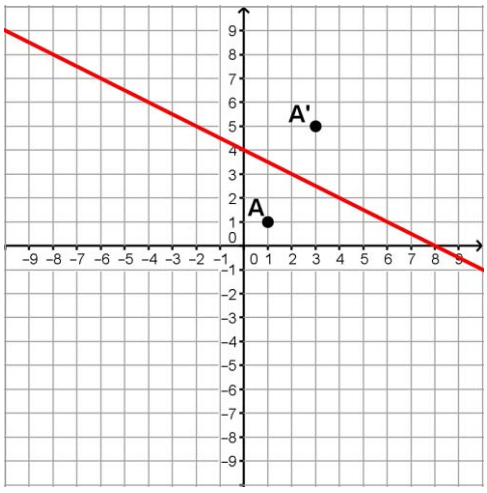
9.



Equation of the Line of Reflection:
$y = 3x + 8$

Equation of the Line $\overleftrightarrow{AA'}$:
$y = -\frac{1}{3}x - \frac{16}{3}$

10.



Equation of the Line of Reflection:
$y = -\frac{1}{2}x + 4$

Equation of the Line $\overleftrightarrow{AA'}$:
$y = 2x - 1$

Go

Topic: Slopes of parallel and perpendicular lines and finding both distance and slope between two points.

Write the slope of a line parallel to the given line.

11. $y = 7x - 3$

$\boldsymbol{m = 7}$

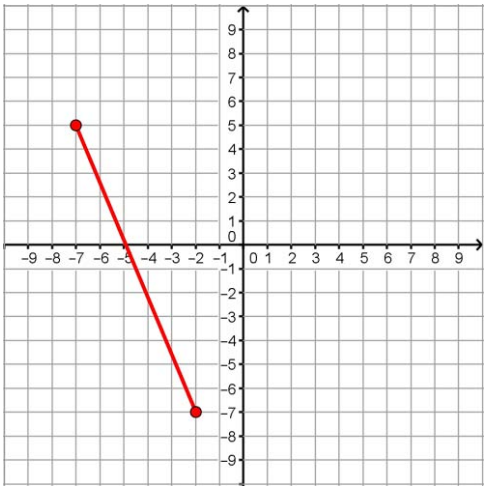
Write the slope of a line perpendicular to the given line.

12. $y = \frac{1}{5}x - 4$

$\boldsymbol{m = -5}$

Find the *slope* between the given pair of points. Then, using the Pythagorean Theorem, find the *distance* between the pair of points. You may use the graph to help you as needed.

13. $(-7, 5)$ $(-2, -7)$



a. Slope:

$-\frac{12}{5}$

b. Distance:

13

Name: **Transformations, Congruence, and Constructions** | **6.4**

Ready, Set, Go

Ready

Topic: Defining geometric shapes and components

For each of the geometric words below write a definition of the object that addresses the essential elements. Also, list necessary attributes and characteristics.

1. Quadrilateral: **Four sided polygon**

2. Parallelogram: **Quadrilateral with two pairs of parallel sides**

3. Rectangle: **Parallelogram with four right angles**

4. Square: **Rectangle with four congruent sides**

5. Rhombus: **Parallelogram with four congruent sides**

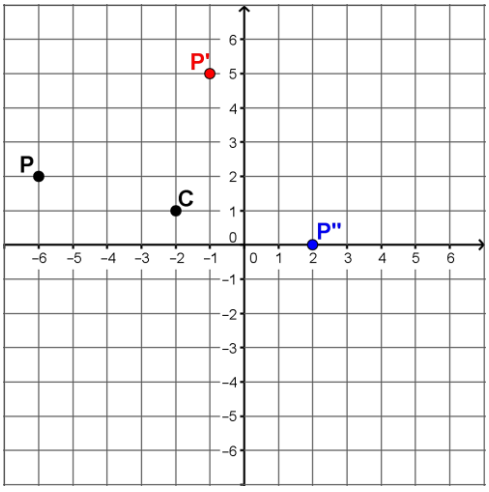
6. Trapezoid: **Quadrilateral with one pair of parallel sides**

Set

Topic: Reflections and rotations, composing reflections to create a rotation

Perform the indicated rotations.

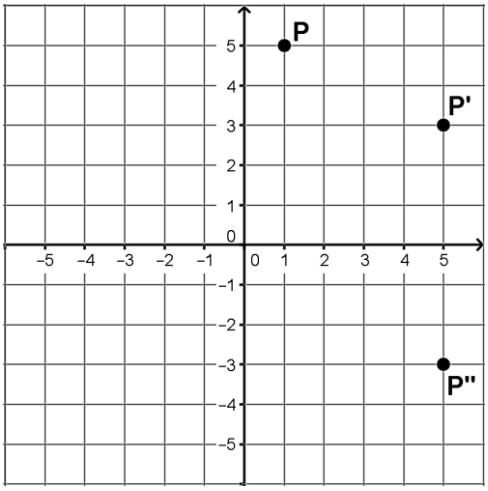
7.



a. Use the center of rotation point ***C*** and rotate point ***P*** around it 90°. Label the image ***P'.***

b. With point ***C*** as a center of rotation also rotate point ***P*** 180°. Label this image ***P''.***

8.



a. What is the equation for the line of reflection that reflects point ***P*** onto ***P'*** ?

$y = 2x - 2$

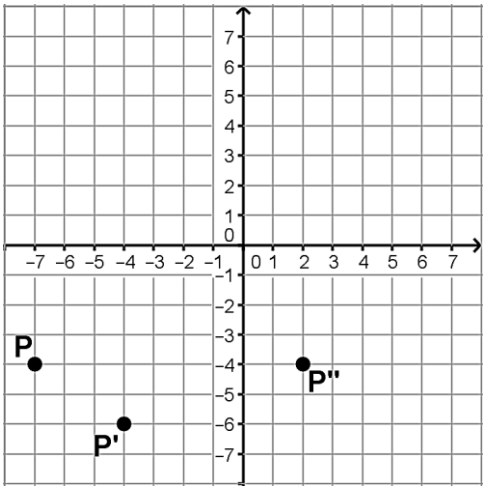
b. What is the equation for the line of reflection that reflects point ***P'*** onto ***P''*** ?

$y = 0$

c. Could ***P''*** also be considered a rotation of point ***P***? If so, what is the center of rotation and how many degrees was point ***P*** rotated?

Yes. The center could be any point on the perpendicular bisector of $\overline{PP'}$

9.



a. What is the equation for the line of reflection that reflects point ***P*** onto ***P'*** ?

$y = \frac{3}{2}x + 3.25$

b. What is the equation for the line of reflection that reflects point ***P'*** onto ***P''*** ?

$y = -3x - 8$

c. Could ***P''*** also be considered a rotation of point ***P***? If so, what is the center of rotation and how many degrees was point ***P*** rotated?

Yes. The center could be any point on the perpendicular bisector of $\overline{PP'}$

Go

Topic: Rotations about the origin

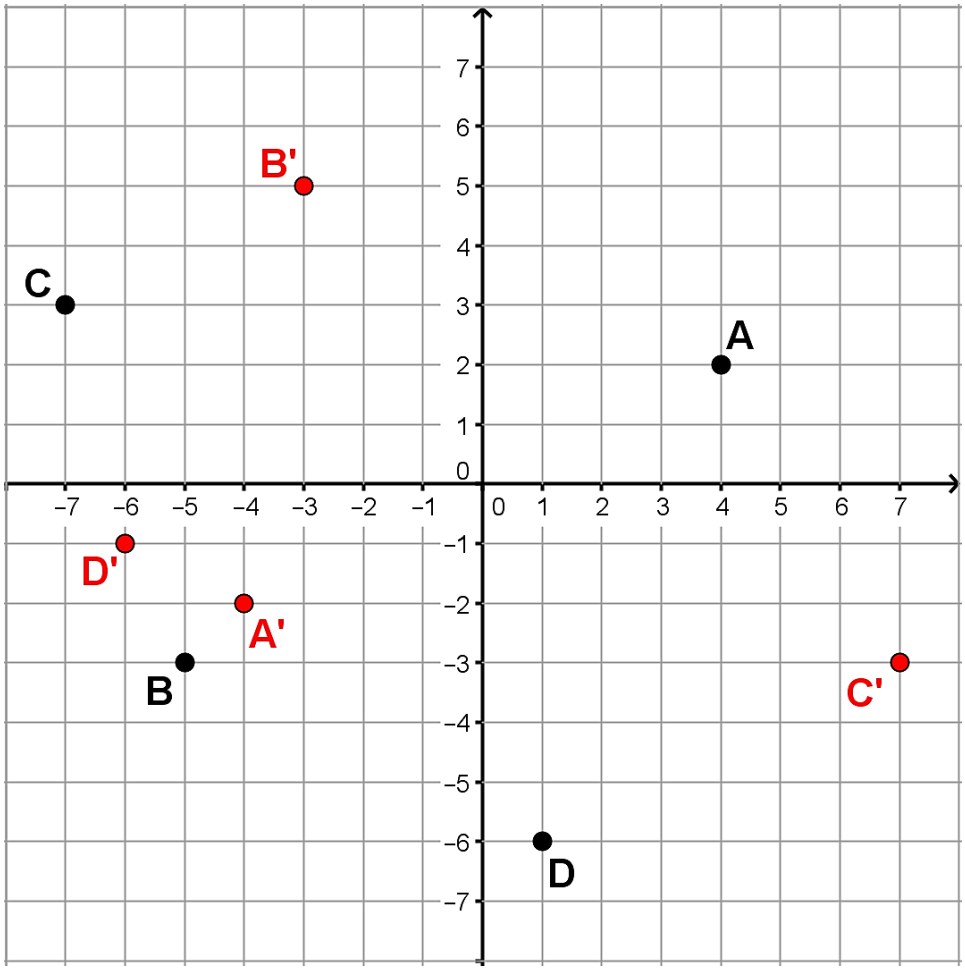
Plot the given coordinate and then perform the indicated rotation around the origin, the point $(0, 0)$, and plot the image created. State the coordinates of the image.

10. Point $A(4, 2)$ rotate 180°
Coordinates for Point A'(−4 , −2)

11. Point $B(-5, -3)$ rotate −90°
Coordinates for Point B'(−3 , 5)

12. Point $C(-7, 3)$ rotate 180°
Coordinates for Point C'(7 , −3)

13. Point $D(1, -6)$ rotate −90°
Coordinates for Point D'(−6 , −1)



Name: **Transformations, Congruence, and Constructions** **6.5**

Ready, Set, Go!

Ready

Topic: Polygons, definition and names

1. What is a polygon? Describe in your own words what a polygon is.

   Answers will vary but should include: closed figure with straight sides and no curves.

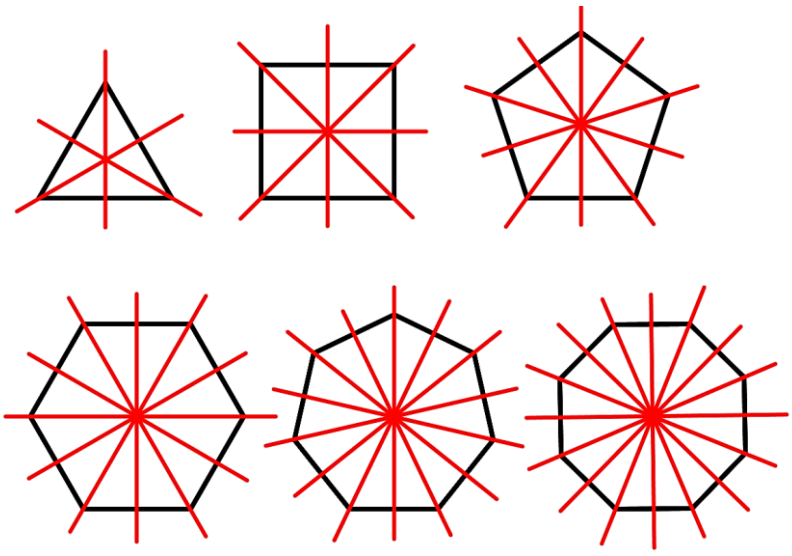
2. Fill in the names of each polygon based on the number of sides the polygon has.

Number of Sides	Name of Polygon
3	**Triangle**
4	**Quadrilateral**
5	**Pentagon**
6	**Hexagon**
7	**Heptagon**
8	**Octagon**
9	**Nonagon**
10	**Decagon**

Set

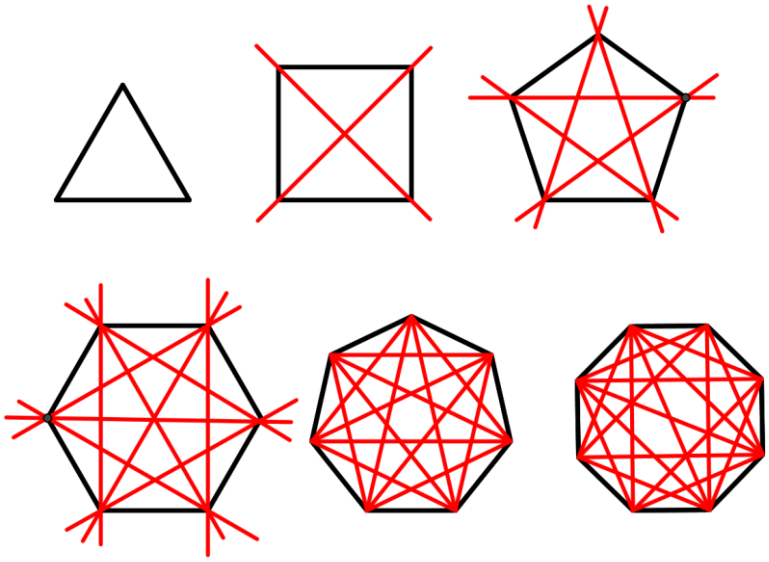
Topic: Lines of symmetry and diagonals

3. Draw the lines of symmetry for each regular polygon, fill in the table including an expression for the number of lines of symmetry in a *n*-sided polygon.



Number of Sides	Number of lines of symmetry
3	**3**
4	**4**
5	**5**
6	**6**
7	**7**
8	**8**
n	***n***

4. Find all of the diagonals in each regular polygon. Fill in the table including an expression for the number of diagonals in a *n*-sided polygon.



Number of Sides	Number of diagonals
3	**0**
4	**2**
5	**5**
6	**9**
7	**14**
8	**20**
n	$\frac{n(n-3)}{2}$

5. Are all lines of symmetry also diagonals? Explain.

No, some lines of symmetry go through the midpoints of opposite sides of the regular polygons which means that these lines of symmetry are not diagonals of the polygon.

6. Are all diagonals also lines of symmetry? Explain.

No, only diagonals that go through the center of regular polygons are lines of symmetry.

7. What shapes will have diagonals that are not lines of symmetry? Name some and draw them.

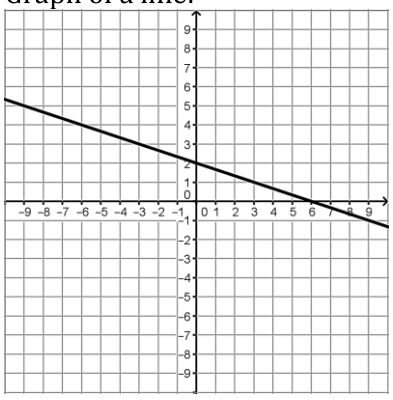
Non-regular polygons

8. Will all parallelograms have diagonals that are lines of symmetry? If so, draw and explain. If not draw and explain.

Only squares and rhombuses have diagonals that are lines of symmetry.

Go

Topic: Equations for parallel and perpendicular lines.

	Find the equation of a line PARALLEL to the given info and through the indicated point.	**Find the equation of a line PERPENDICULAR to the given line and through the indicated point.**
9. Equation of a line: $y = 4x + 1$	a. Parallel line through point $(-1, -7)$: $\boldsymbol{y = 4x - 3}$	b. Perpendicular line though point $(-1, -7)$: $\boldsymbol{y = -\frac{1}{4}x - \frac{29}{4}}$
10. Table of a line: x | y 3 | -8 4 | -10 5 | -12 6 | -14	a. Parallel line through point $(3, 8)$: $\boldsymbol{y = -2x + 14}$	b. Perpendicular to the line through point $(3, 8)$: $\boldsymbol{y = \frac{1}{2}x + \frac{13}{2}}$
11. Graph of a line: 	a. Parallel line through point $(2, -9)$: $\boldsymbol{y = -\frac{1}{3}x - 8\frac{1}{3}}$	b. Perpendicular line through point $(2, -9)$: $\boldsymbol{y = 3x - 15}$

Name: **Transformations, Congruence, and Constructions** | **6.6**

Ready, Set, Go!

Ready

Topic: Defining congruence and similarity.

1. What do you know about two figures if they are congruent?
   Same side lengths and same angle measurements

2. What do you need to know about two figures to be convinced that the two figures are congruent?

   There is a sequence of rigid motions that map one onto the other.

3. What do you know about two figures if they are similar?

   Same shape (angle measures are the same) but different side lengths.

4. What do you need to know about two figures to be convinced that the two figures are similar?

   There is a dilation that maps one onto the other.

Set

Topic: Classifying quadrilaterals based on their properties.

Using the information given determine the most specific classification of the quadrilateral.

5. Has 180° rotational symmetry.
   Parallelogram

6. Has 90° rotational symmetry.
   Square

7. Has two lines of symmetry that are diagonals.
   Rhombus

8. Has two lines of symmetry that are not diagonals.
   Rectangle

9. Has congruent diagonals.
   Rectangle

10. Has diagonals that bisect each other.
    Parallelogram

11. Has diagonals that are perpendicular.
    Rhombus

12. Has congruent angles.
    Rectangle

Go

Topic: Slope and distance

Find the *slope* between each pair of points. Then, using the Pythagorean Theorem, find the *distance* between each pair of points.

13. $(-3,-2)$ $(0,0)$

    a. Slope: $\frac{2}{3}$ b. Distance: $\sqrt{13}$

14. $(7,-1)$ $(11,7)$

    a. Slope: 2 b. Distance: $4\sqrt{5}$

15. $(-10,13)$ $(-5,1)$

    a. Slope: $-\frac{12}{5}$ b. Distance: 13

16. $(-6,-3)$ $(3,1)$

    a. Slope: $\frac{4}{9}$ b. Distance: $\sqrt{97}$

17. $(5,22)$ $(17,28)$

    a. Slope: $\frac{1}{2}$ b. Distance: $6\sqrt{5}$

18. $(1,-7)$ $(6,5)$

    a. Slope: $\frac{12}{5}$ b. Distance: 13

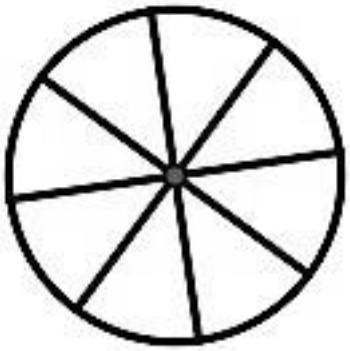
Name: **Transformations, Congruence, and Constructions** **6.7**

Ready, Set, Go!

Ready

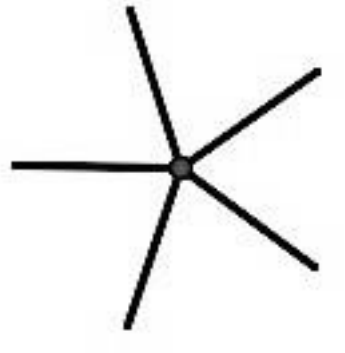
Topic: Rotation as a transformation

1. What fraction of a turn does the wagon wheel below need to turn in order to appear the very same as it does right now? How many degrees of rotation would that be?



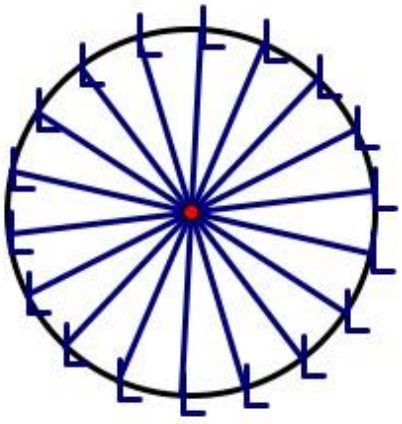
$\frac{1}{8}$ of a turn; 45°

2. What fraction of a turn does the propeller below need to turn in order to appear the very same as it does right now? How many degrees of rotation would that be?



$\frac{1}{5}$ of a turn; 72°

3. What fraction of a turn does the model of a Ferris wheel below need to turn in order to appear the very same as it does right now? How many degrees of rotation would that be?

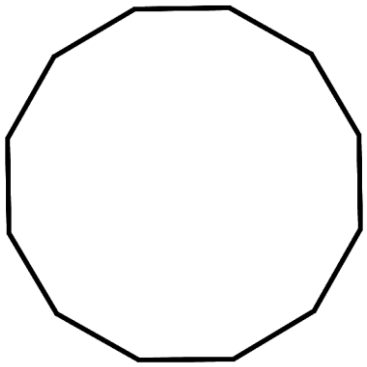


$\frac{1}{18}$ of a turn; 20°

Set

Topic: Finding angles of rotation for regular polygons.

4. Find the angle(s) of rotation that will carry the 12 sided polygon below onto itself.



30°

5. What are the angles of rotation (less than 360°) for a 20-gon? How many lines of symmetry (lines of reflection) will it have?

18°, 36°, 54°, 72°, 90°, 108°, 126°, 144°, 162°, 180°, 198°, 216°, 234°, 252°, 270°, 288°, 306°, 324°, 342°
20 lines of symmetry

6. What are the angles of rotation (less than 360°) for a 15-gon? How many line of symmetry (lines of reflection) will it have?

24°, 48°, 72°, 96°, 120°, 144°, 168°, 192°, 216°, 240°, 264°, 288°, 312°, 336°
15 lines of symmetry

7. How many sides does a regular polygon have that has an angle of rotation equal to 18°? Explain.

20 sides
20 lines of symmetry

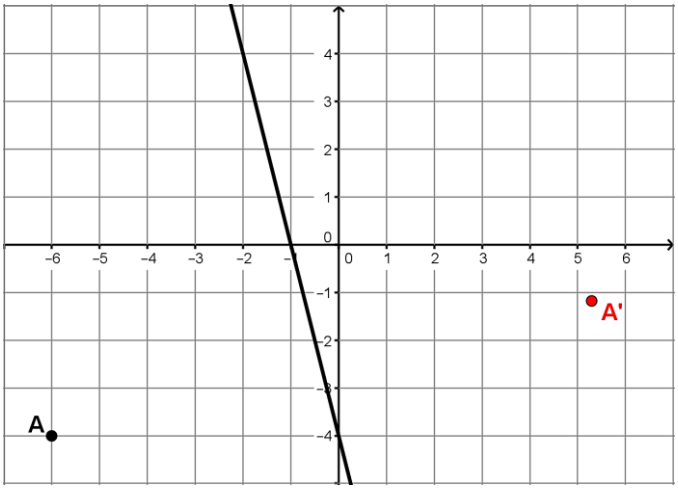
8. How many sides does a regular polygon have that has an angle of rotation equal to 20°? How many lines of symmetry will it have?

18 sides
18 lines of symmetry

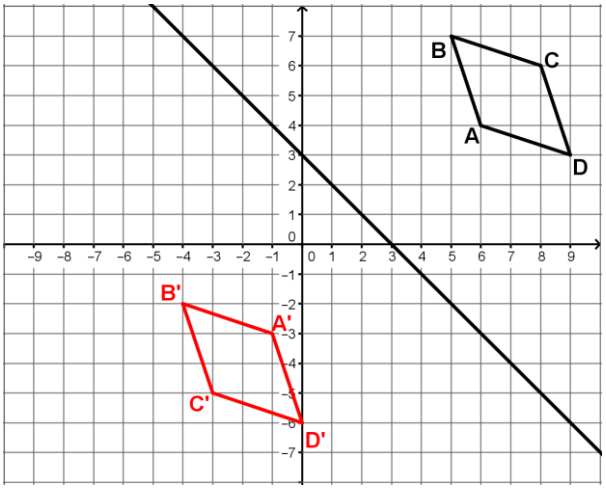
Go

Topic: Reflecting and rotating points on the coordinate plane.

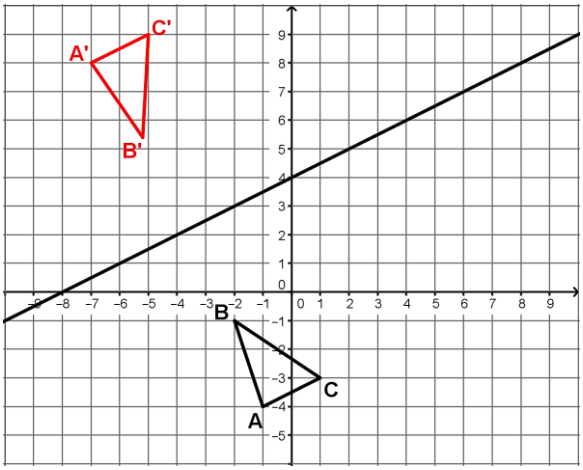
9. Reflect point ***A*** over the given line of reflection and label the image ***A'***.



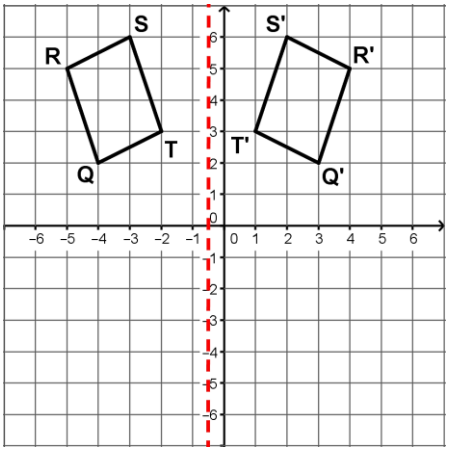
10. Reflect parallelogram ***ABCD*** over the given line of reflection and label the image ***A'B'C'D'.***



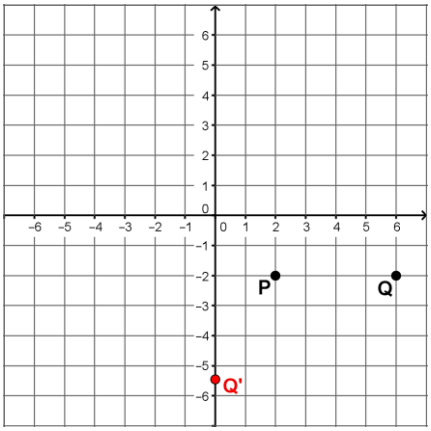
11. Reflect triangle ***ABC*** over the given line of reflection and label the image ***A'B'C'***.



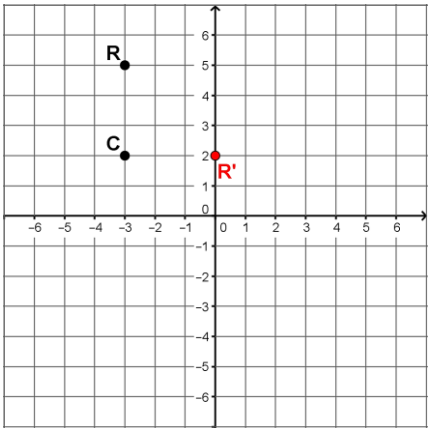
12. Given parallelogram ***QRST*** and its image ***Q'R'S'T'*** draw the line of reflection that was used.



13. Using point ***P*** as a center of rotation. Rotate point ***Q*** 120° about point ***P*** and label the image ***Q'***.



14. Using point ***C*** as the center or rotation. Rotate point ***R*** 270° about point ***C*** and label the image ***R'***.



Name: **Transformations, Congruence, and Constructions** | **6.8**

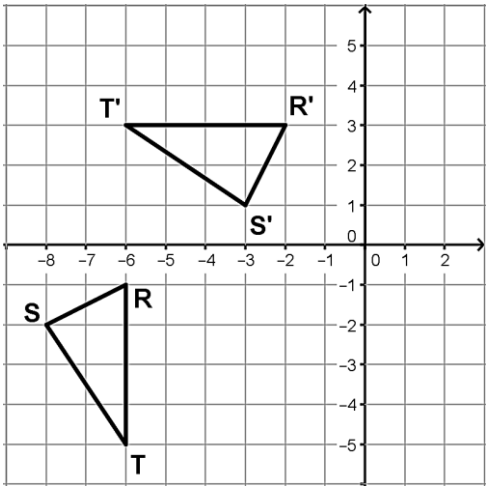
Set, Go!

Set

Topic: Find the sequence of transformations.

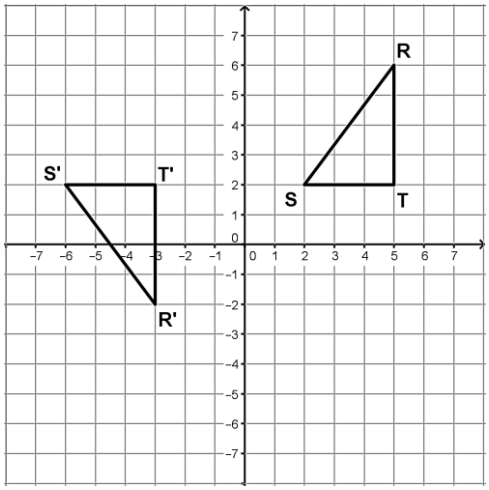
Find the sequence of transformations that will carry ΔRST onto $\Delta R'S'T'$. Clearly describe the sequence of transformations below each grid.

1.



Translate 8 units up, rotate 90° about point T, and reflect about $y = 3$.

2.



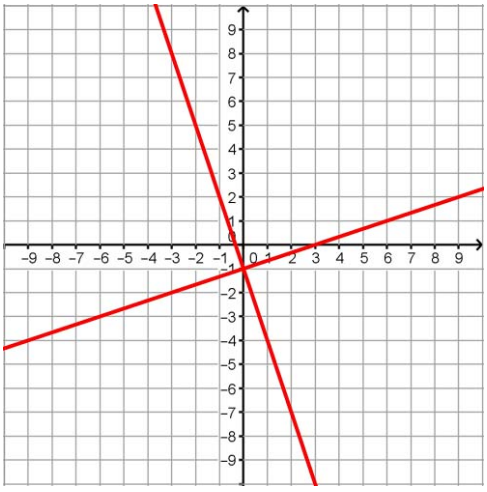
Translate 8 units left, reflect over $y = 2$.

Go

Topic: Graphing functions and making comparisons.

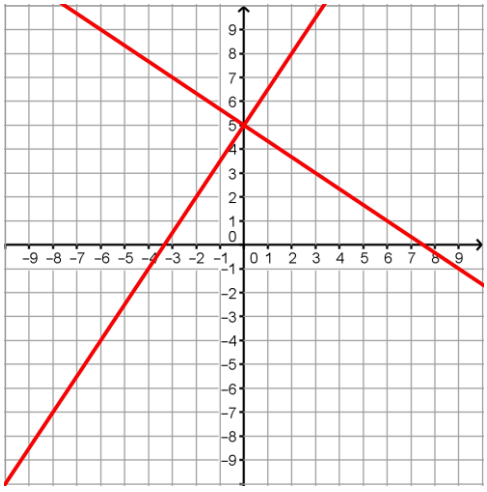
Graph each pair of functions and make an observation about how the functions compare to one another.

3. $y = \frac{1}{3}x - 1$
   $y = -3x - 1$



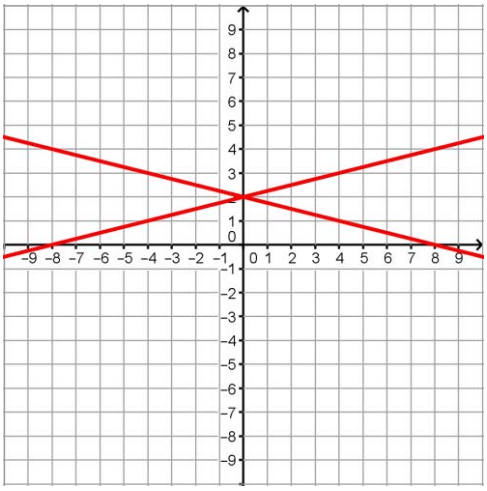
The lines are perpendicular

4. $y = -\frac{2}{3}x + 5$
   $y = \frac{3}{2}x + 5$



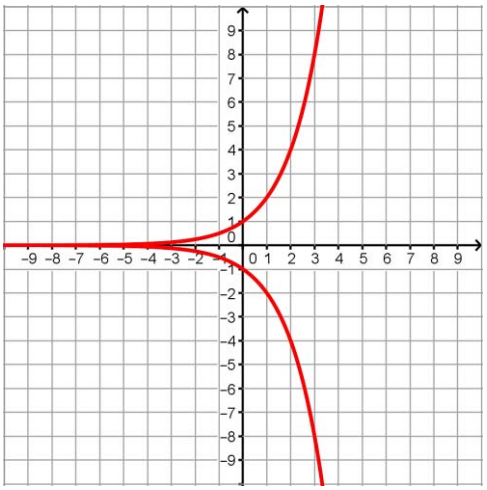
The lines are perpendicular

5. $y = \frac{1}{4}x + 2$
   $y = -\frac{1}{4}x + 2$



The lines have the same *y*-intercept

6. $y = 2^x$
   $y = -2^x$



The curves are reflections over the *x*-axis.

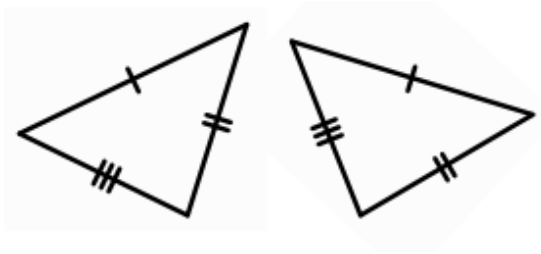
Name: **Transformations, Congruence, and Constructions** | **6.9**

Set, Go!

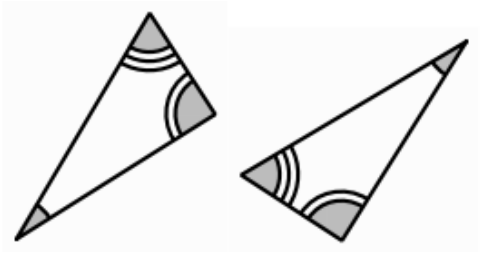
Set

Topic: Triangle congruencies

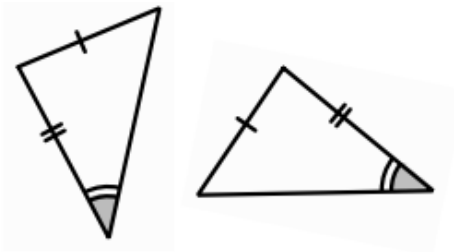
Explain whether or not the triangles are congruent, similar, or neither based on the markings that indicate congruence.

1. 

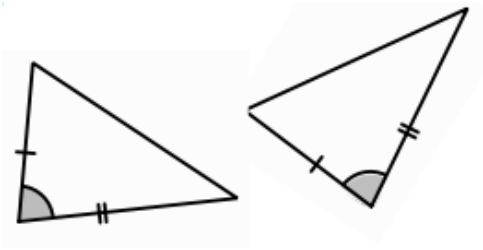
Congruent

2. 

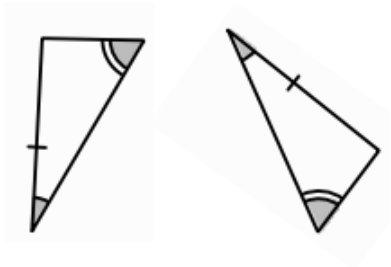
Similar

3. 

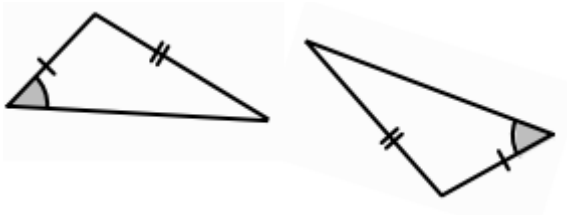
Neither

4. 

Congruent

5. 

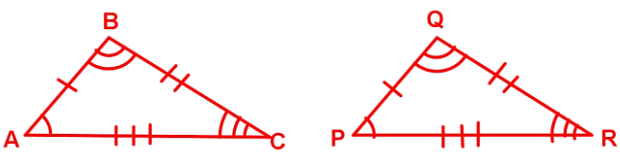
Congruent

6. 

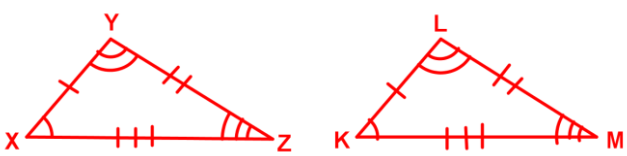
Neither

Use the given congruence statement to draw and label two triangles that have the proper corresponding parts congruent to one another.

7. $\Delta ABC \cong \Delta PQR$



8. $\Delta XYZ \cong \Delta KLM$



Go

Topic: Review of solving equations and finding recursive rules for sequences.

Solve each equation for *t*.

9. $\frac{3t-4}{5} = 5$

   $\boldsymbol{t = \frac{29}{3}}$

10. $10 - t = 4t + 12 - 3t$

    $\boldsymbol{t = -1}$

11. $P = 5t - d$

    $\boldsymbol{t = \frac{P+d}{5}}$

12. $xy - t = 13t + w$

    $\boldsymbol{t = \frac{xy-w}{14}}$

Use the given sequence of numbers to write a recursive rule for the n^{th} value of the sequence.

13. $5, 15, 45, \ldots$

    $\boldsymbol{f(1) = 5,\ f(n) = f(n-1) \cdot 3}$

14. $\frac{1}{2}, 0, -\frac{1}{2}, -1, \ldots$

    $\boldsymbol{f(1) = \frac{1}{2},\ f(n) = f(n-1) - \frac{1}{2}}$

15. $3, -6, 12, -24, \ldots$

    $\boldsymbol{f(1) = 3,\ f(n) = f(n-1) \cdot (-2)}$

16. $\frac{1}{2}, \frac{1}{4}, \frac{1}{8}, \ldots$

    $\boldsymbol{f(1) = \frac{1}{2},\ f(n) = f(n-1) \cdot \frac{1}{2}}$

Name: **Transformations, Congruence, and Constructions** | **6.10**

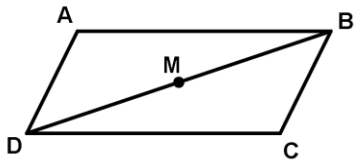
Set, Go!

Set

Topic: Use congruent triangle criteria and transformations to justify conjectures.

In each problem below there are some true statements listed. From these statements a conjecture (a guess) about what might be true has been made. Using the given statements and conjecture statement create an argument that justifies the conjecture.

1. True statements:
   Point M is the midpoint of $\overline{DB}$
   $\angle ABD \cong \angle BDC$
   $\overline{AB} \cong \overline{DC}$

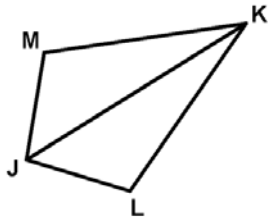


Conjecture: $\angle A \cong \angle C$

a. Is the conjecture correct? **Yes**

b. Argument to prove you are right:
The two triangles are congruent by SAS. Therefore, the corresponding parts are congruent.

2. True statements:
   $\angle KJL \cong \angle KJM$
   $\overline{JL} \cong \overline{JM}$

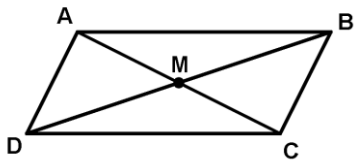


Conjecture: $\overline{JK}$ bisects $\angle MKL$

a. Is the conjecture correct? **Yes**

b. Argument to prove you are right:
The two triangles are congruent by SAS. Therefore, corresponding parts are congruent since $\angle MKJ \cong \angle LKJ$ and $\overline{JK}$ bisects $\angle MKL$

3. True statements:
   ΔADM is a 180° rotation of ΔCMB



Conjecture: $\Delta ABM \cong \Delta CDM$

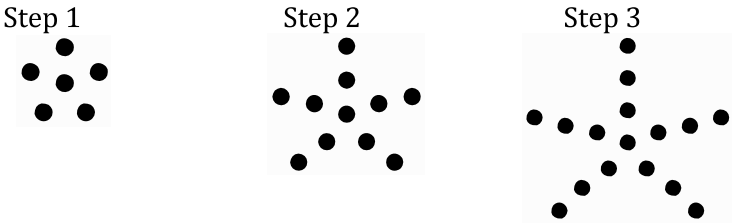
a. Is the conjecture correct? **Yes**

b. Argument to prove you are right:
A rotation maps ΔADM only CMB. Therefore, $\Delta ADM \cong \Delta CMB$, $\overline{AM} \cong \overline{CM}$, and $\overline{DM} \cong \overline{MB}$. $\angle AMB \cong \angle DMC$ because $\angle AMD \cong \angle BMC$ and they are 2 linear pairs $\angle AMB$ & $\angle AMD$ and $\angle DMC$ & $\angle MBC$. Therefore, the triangles are congruent by SAS.

Go

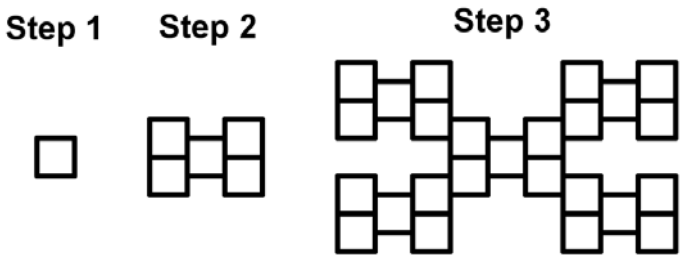
Topic: Create both explicit and recursive rules for the visual patterns.

4. Find an explicit function rule and a recursive rule for dots in step *n*.



Explicit: $f(n) = 5(n-1) + 6$
Recursive: $f(1) = 6,\ f(n) = f(n-1) + 5$

5. Find an explicit function rule and a recursive rule for squares in step *n*.



Explicit: $f(n) = 5^{n-1}$
Recursive: $f(1) = 1,\ f(n) = f(n-1) \cdot 5$

Find an explicit function rule and a recursive rule for the values in each table.

6.

Step	Value
1	1
2	11
3	21
4	31

Explicit: $f(n) = 10n - 9$
Recursive: $f(1) = 1,$
$f(n) = f(n-1) + 10$

7.

n	$f(n)$
2	16
3	8
4	4
5	2

Explicit: $f(n) = 16\left(\frac{1}{2}\right)^{n-2}$

Recursive: $f(2) = 16$
$f(n) = f(n-1) \cdot \frac{1}{2}$

8.

n	$f(n)$
1	-5
2	25
3	-125
4	625

Explicit: $f(n) = (-5)^{n-1}$
Recursive: $f(1) = -5$
$f(n) = f(n-1) \cdot (-5)$

Name: **Transformations, Congruence, and Constructions** | **6.11**

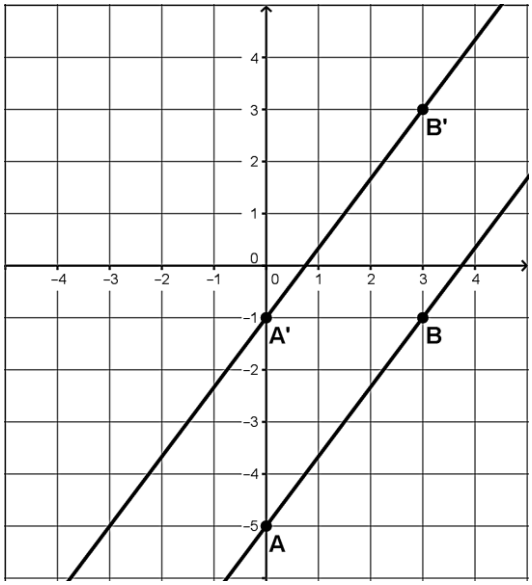
Ready, Set, Go!

Ready

Topic: Transformations of lines

For each set of lines use the points on the line to determine which line is the image and which is the pre-image, label them, write image by the image line and pre image by the original line. Then define the transformation that was used to create the image. Finally find the equation for each line.

1.



a. Description of Transformation:

translated 4 units up

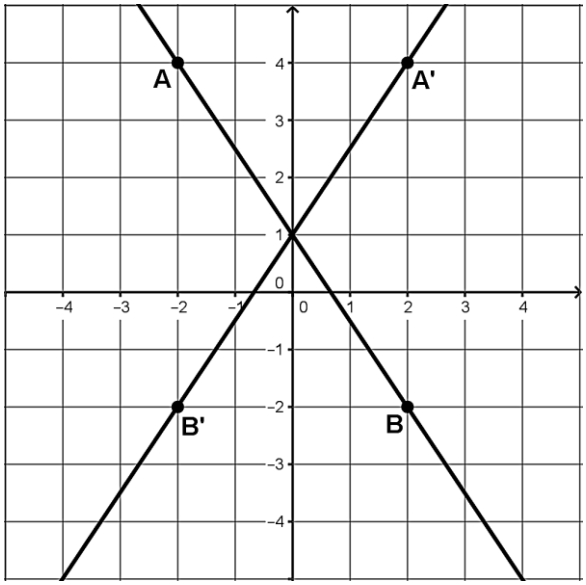
b. Equation for pre-image:

$y = \frac{4}{3}x - 5$

c. Equation for image:

$y = \frac{4}{3}x - 1$

2.



a. Description of Transformation:

Reflect about $x = 0$

b. Equation for pre-image:

$y = -\frac{3}{2}x + 1$

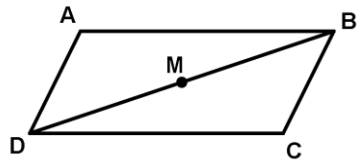
c. Equation for image:

$y = \frac{3}{2}x + 1$

Set

Topic: Triangle congruence properties

3. True statements:
   $\angle ABD \cong \angle BDC$
   $\angle A \cong \angle C$
   $\overline{AB} \cong \overline{DC}$

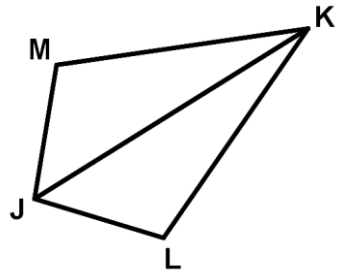


Conjecture: $\overline{AD} \cong \overline{CB}$

a. Is the conjecture correct? **Yes**

b. Argument to prove you are right:
The triangles are congruent ASA. Therefore, $\overline{AD} \cong \overline{CB}$ because they are corresponding parts of congruent triangles.

4. True statements:
   $\angle LKJ \cong \angle MKJ$
   $\overline{MK} \cong \overline{LK}$

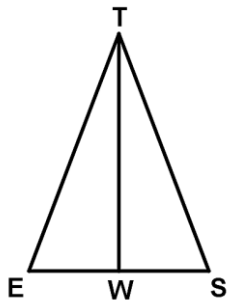


Conjecture: $\overline{JK}$ bisects $\angle MJL$

a. Is the conjecture correct? **Yes**

b. Argument to prove you are right:
The triangles are congruent by SAS. Therefore, $\angle MJK \cong \angle KJL$ because they are corresponding parts of congruent triangles.

5. True statements:
   W is the midpoint of $\overline{ES}$
   $\overline{ET} \cong \overline{TS}$



Conjecture: $\overline{TW}$ is perpendicular to $\overline{ES}$

a. Is the conjecture correct? **Yes**

b. Argument to prove you are right:
The triangles are congruent by SSS. Therefore, $\angle EWT \cong \angle SWT$ because they are corresponding parts of congruent triangles. They are 180° together and 90° each.

Go

Topic: Solving systems of equations

Solve each system of equations. Utilize substitution or elimination.

6. $\begin{cases} x = 11 + y \\ 2x + y = 19 \end{cases}$

   $(\mathbf{10}, \mathbf{-1})$

7. $\begin{cases} -4x + 9y = 9 \\ x - 3y = -6 \end{cases}$

   $(\mathbf{9}, \mathbf{5})$

8. $\begin{cases} x + 2y = 11 \\ x - 4y = 2 \end{cases}$

   $\left(\mathbf{8}, \frac{\mathbf{3}}{\mathbf{2}}\right)$

9. $\begin{cases} y = -x + 1 \\ y = 2x + 1 \end{cases}$

   $(\mathbf{0}, \mathbf{1})$

10. $\begin{cases} y = -2x + 7 \\ -3x + y = -8 \end{cases}$

    $(\mathbf{3}, \mathbf{1})$

11. $\begin{cases} 4x - y = 7 \\ -6x + 2y = 8 \end{cases}$

    $(\mathbf{11}, \mathbf{37})$

Name: **Transformations, Congruence, and Constructions** **6.12**

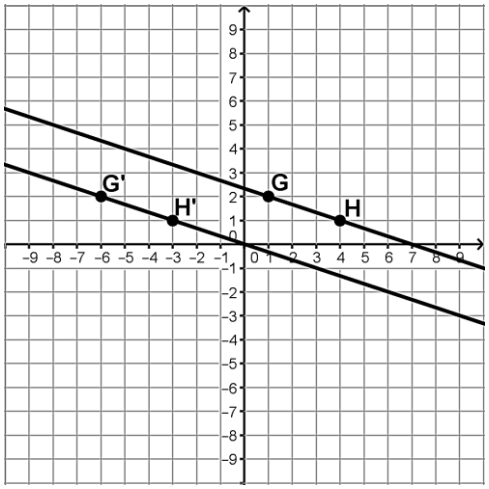
Ready, Go!

Ready

Topic: Transformations of lines, algebraic and geometric thoughts.

For each set of lines use the points on the line to determine which line is the image and which is the pre-image, label them, write image by the image line and pre image by the original line. Then define the transformation that was used to create the image. Finally find the equation for each line.

1.



a. Description of Transformation:

Translate left 7

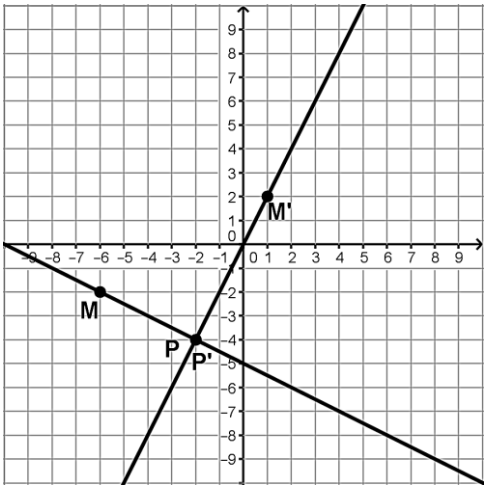
b. Equation for pre-image:

$y = -\frac{1}{3}x + 2\frac{1}{3}$

c. Equation for image:

$y = -\frac{1}{3}x$

2.



a. Description of Transformation:

Rotate 90° about *P*

b. Equation for pre-image:

$y = -\frac{1}{2}x - 5$

c. Equation for image:

$y = 2x$

Go

Topic: Triangle congruence and properties of polygons.

3. What is the minimum amount of information needed to determine that two triangles are congruent? List all possible combinations of needed criteria.

   3 pieces of information (angles and/or sides) are needed to determine that two triangles are congruent.
   Possible combinations of needed criteria: SSS, ASA, SAS, AAS

4. What is a line of symmetry and what is a diagonal? Are they the same thing? Could they be the same in a polygon? If so give an example, if not explain why not.

   A line of symmetry cuts the diagonal into two congruent shapes that are mirror images of each other.
   A diagonal connects two non-adjacent vertices

5. How is the number of lines of symmetry for a *regular* polygon connected to the number of sides of the polygon? How is the number of diagonals for a polygon connected to the number of sides?

   The number of lines of symmetry for a regular polygon is the same as the number of sides of the polygon.

   The number of diagonals is equation to $\frac{n(n-3)}{2}$ where *n* is the number of sides.

6. What do right triangles have to do with finding distance between points on a coordinate grid?

   The Pythagorean Theorem can be used to find the distance between points on the coordinate grid.

Name: **Transformations, Congruence, and Constructions** **6.13**

Set, Go!

Set

Topic: Transformations and triangle congruence.

Determine whether or not the statement is true or false. If true, explain why. If false, explain why not or provide a counterexample.

1. If one triangle can be transformed so that one of its angles and one of its sides coincide with another triangle's angle and side then the two triangles are congruent.

   False. There is a possibility of having a SSA situation.

2. If one triangle can be transformed so that two of its sides and any one of its angles will coincide with two sides and an angle from another triangle then the two triangles will be congruent.

   False. There is a possibility of having a SSA situation.

3. If three angles of one triangle are congruent to three angles of another triangle, then there is a sequence of transformations that will transform one triangle onto the other.

   False. The triangles may be similar or congruent.

4. If three sides of one triangle are congruent to three sides of another triangle, then there is a sequence of transformations that will transform one triangle onto the other.

   True. SSS is one of the triangle congruencies.

5. For any two congruent polygons there is a sequence of transformations that will transform one of the polygons onto the other.

   True. If the polygons are congruent, they can be rotated, reflected, and/or translated to transform one onto the other.

Go

Topic: Finding distance and slope.

For each pair of given coordinate points find distance between them and find the slope of the line that passes through them. Show all your work.

6. $(-10, 31)$ $(20, 11)$

   a. Slope: $-\frac{2}{3}$

   b. Distance: $10\sqrt{13}$

7. $(16, -45)$ $(-34, 75)$

   a. Slope: $-\frac{12}{5}$

   b. Distance: 130

8. $(8, 21)$ $(20, -11)$

   a. Slope: $-\frac{8}{3}$

   b. Distance: $4\sqrt{73}$

9. $(-10, 0)$ $(14, -18)$

   a. Slope: $-\frac{3}{4}$

   b. Distance: 30

Name: **Transformations, Congruence, and Constructions** | **6.14**

Ready, Go!

Ready

Topic: Rotation symmetry for regular polygons and transformations

1. What angles of rotational symmetry are there for a regular pentagon?

   72°, 144°, 216°, 288°, 360°

2. What angles of rotational symmetry are there for a regular hexagon?

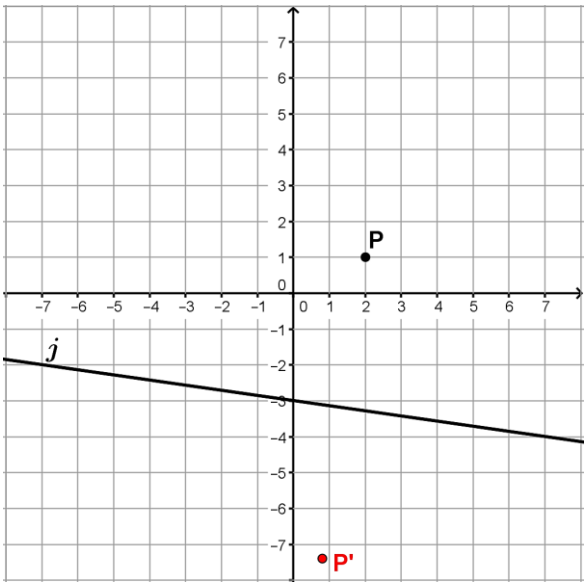
   60°, 120°, 180°, 240°, 300°, 360°

3. If a regular polygon has an angle of rotational symmetry that is 40°, how many sides does the polygon have?

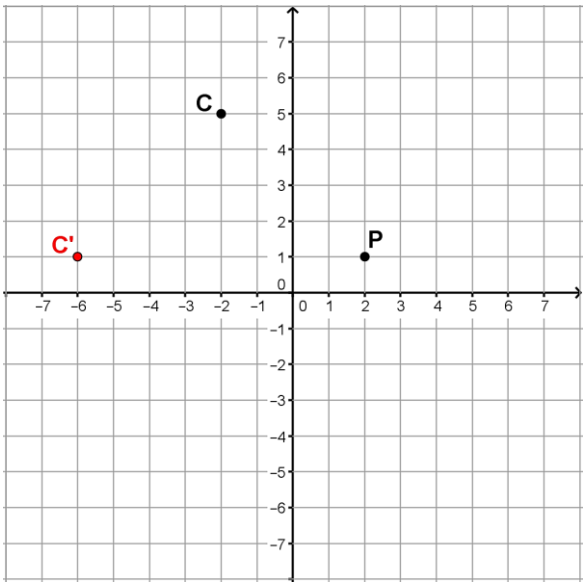
   9 sides

On each given coordinate grid below perform the indicated transformation.

4. Reflect point ***P*** over line ***j***.



5. Rotate ***P*** 90° around point ***C***.



Go

Topic: Finding distance and slope.

For each pair of given coordinate points find distance between them and find the slope of the line that passes through them. Show all your work.

6. $(-2, 8)\ (3, -4)$

   a. Slope: $-\frac{12}{5}$ b. Distance: 13

7. $(-7, -3)\ (1, 5)$

   a. Slope: 1 b. Distance: $8\sqrt{2}$

8. $(3, 7)\ (-5, 9)$

   a. Slope: $-\frac{1}{4}$ b. Distance: $2\sqrt{17}$

9. $(1, -5)\ (-7, 1)$

   a. Slope: $\frac{3}{4}$ b. Distance: 10

Name: **Transformations, Congruence, and Constructions** **6.15**

Ready!

Ready

Topic: Connecting tables with transformations.

For each function find the outputs that fill in the table. Then describe the relationship between the outputs in each table.

1. $f(x) = 3x$ $g(x) = 3x - 5$

x	$f(x)$
1	**3**
2	**6**
3	**9**
4	**12**

x	$g(x)$
1	**−2**
2	**1**
3	**4**
4	**7**

Relationship between $f(x)$ and $g(x)$:
$g(x)$ is 5 less than $f(x)$

2. $t(x) = 2x$ $h(x) = 2x - 5$

x	$t(x)$
1	**2**
2	**4**
3	**6**
4	**8**

x	$h(x)$
1	**−3**
2	**−1**
3	**1**
4	**3**

Relationship between $t(x)$ and $h(x)$:
$h(x)$ is 5 less than $t(x)$

3. $f(x) = 2x$ $g(x) = 2(x - 3)$

x	$f(x)$
1	**2**
2	**4**
3	**6**
4	**8**

x	$g(x)$
1	**−4**
2	**−2**
3	**0**
4	**2**

Relationship between $f(x)$ and $g(x)$:
$g(x)$ is always 6 less than $f(x)$

4. $t(x) = 4^x$ $h(x) = 4^{(x-3)}$

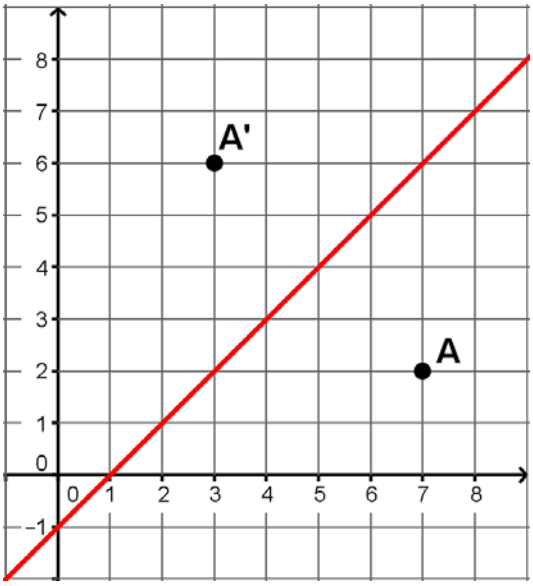
x	$t(x)$
1	**4**
2	**16**
3	**64**
4	**256**

x	$h(x)$
1	**$\frac{1}{16}$**
2	**$\frac{1}{4}$**
3	**1**
4	**4**

Relationship between $t(x)$ and $h(x)$:
$h(x)$ is always 3 steps behind $t(x)$

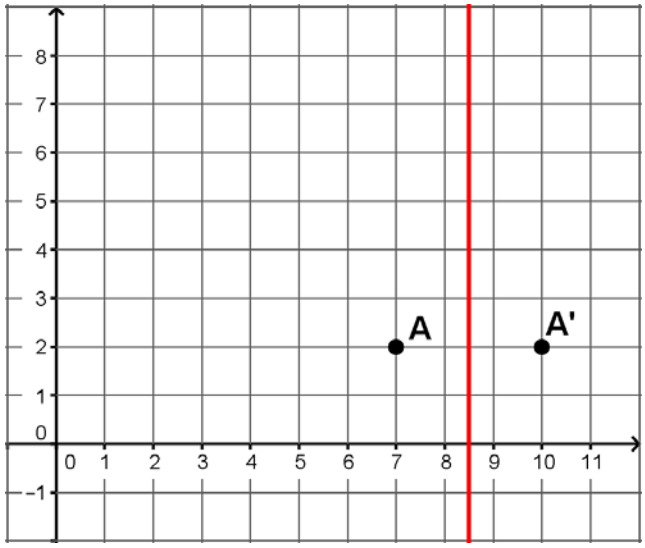
In each figure find and mark at least four possible centers of rotation that would work for rotating the pre-image point to the image point.

5.



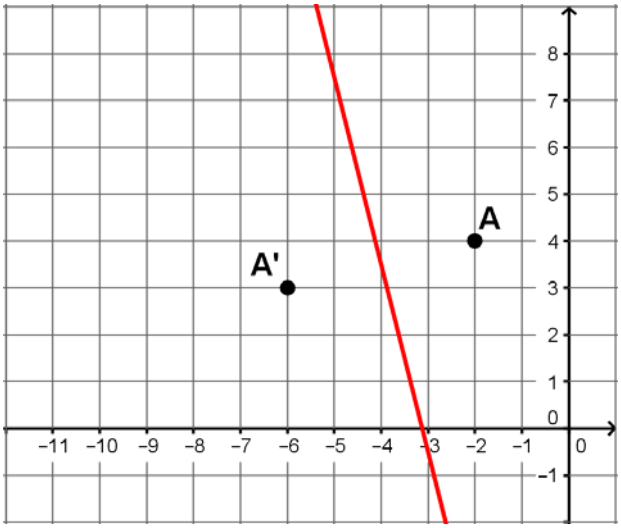
Centers of rotation: **Answers may vary.**
Any point on the lines $y = x - 1$.

6.



Centers of rotation: **Answers may vary.**
Any point on the line $x = 8.5$.

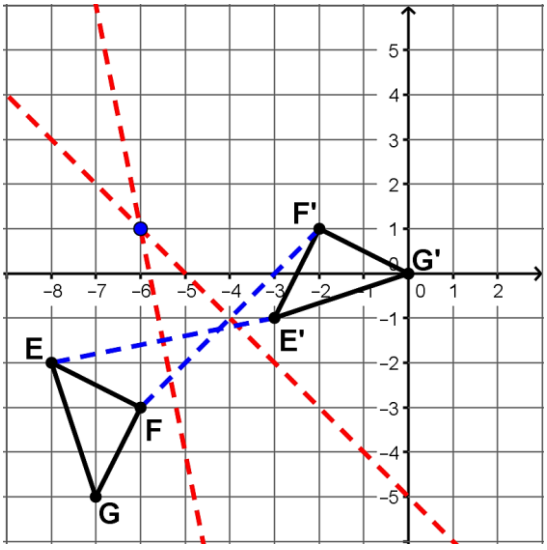
7.



Centers of rotation: **Answers may vary.**
Any point on the line $y = -4x - \frac{25}{2}$.

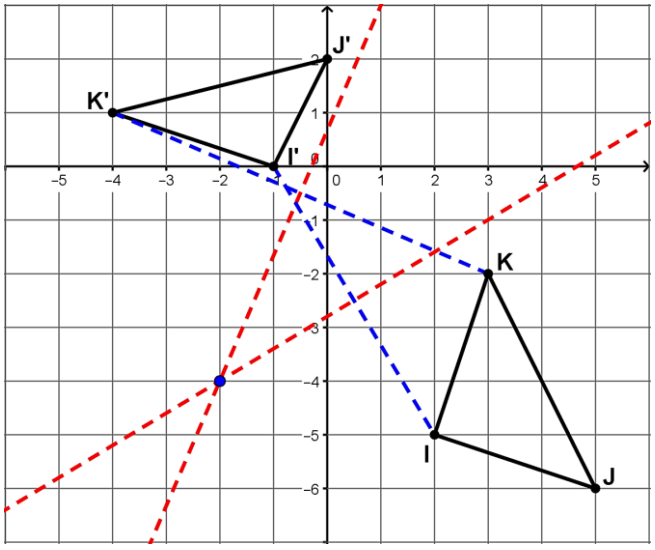
Find the point of rotation that maps each pre-image to the image.

8.



$(-6, 1)$

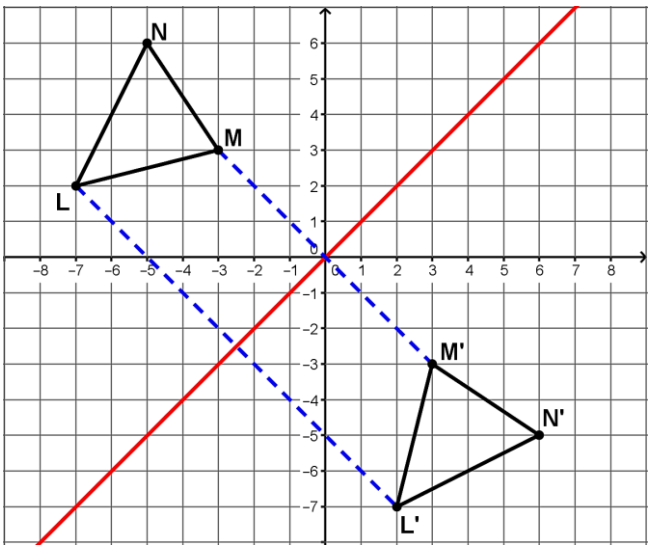
9.



$(-2, -4)$

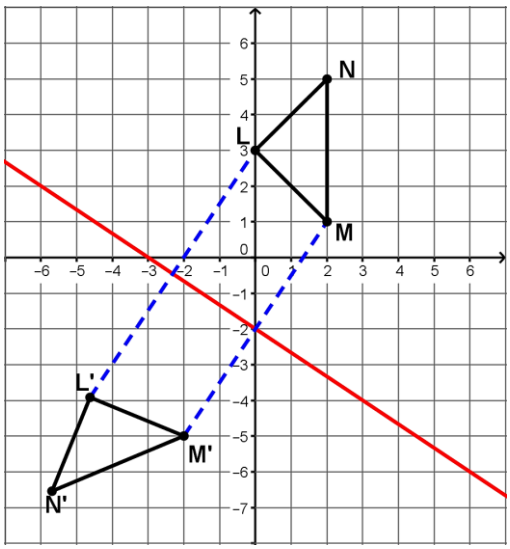
Find the line of reflection that maps each pre-image to the image.

10.



$y = x$

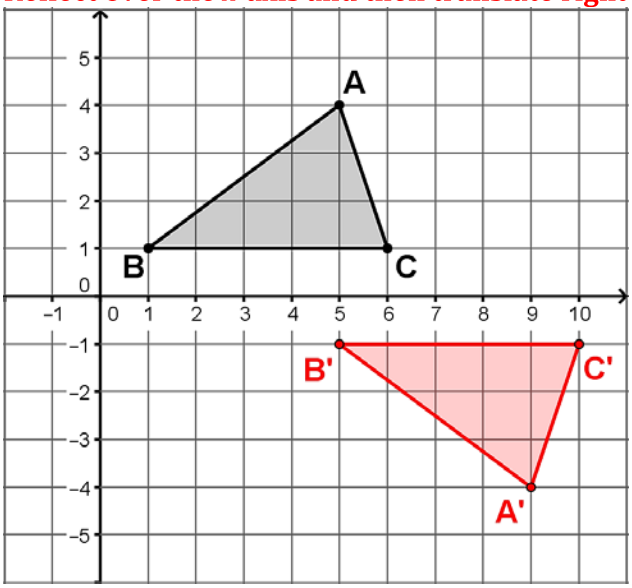
11.



$y = -\frac{2}{3}x - 2$

Module 6 Review Homework

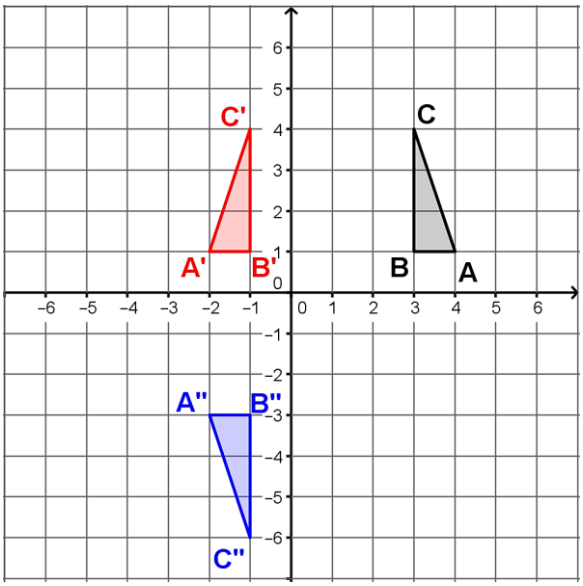
1. Describe the sequence of rigid motions that shows $\Delta ABC \cong \Delta A'B'C'$.
Reflect over the *x*-axis and then translate right 4 units.



2. Use the coordinate grid, below, to complete parts (a)–(c).
   a. Reflect ΔABC across the vertical line, parallel to the y-axis, going through point $(1, 0)$. Label the transformed points ABC as A', B', C', respectively.
   See image in RED below.

   b. Reflect $\Delta A'B'C'$ across the horizontal line, parallel to the x-axis going through point $(0, -1)$. Label the transformed points of $A'B'C'$ as $A''B''C''$, respectively.
   See image in BLUE below.

   c. Describe a single rigid motion that would map ΔABC to $\Delta A''B''C''$.
   Rotation 180° about the origin.

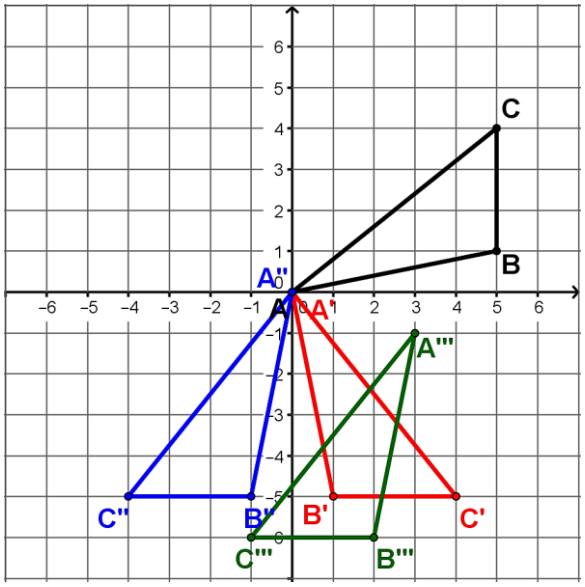


3. Pre-image: $A(0,0), B(5,1), C(5,4)$

a. Rotate the figure $-90°$ about the origin. Label the image as $A'B'C'$.
See image in RED.

b. Reflect $A'B'C'$ over the y-axis. Label the image as $A''B''C''$.
See image in BLUE.

c. Translate $A''B''C''$ right 3 units and down 1 unit. Label the image as $A'''B'''C'''$.
See image in GREEN.

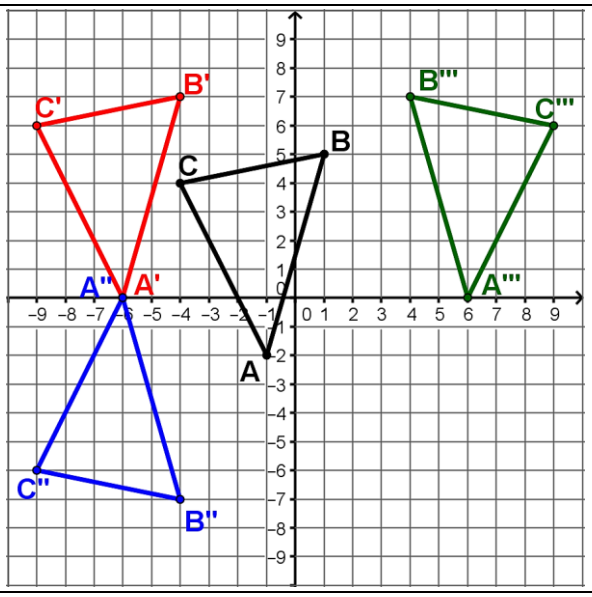


4. Pre-image: $A(-1,-2), B(1,\ 5), C(-4,4)$

a. Translate the figure up 2 units and left 5 units. Label the image as $A'B'C'$.
See image in RED.

b. Reflect $A'B'C'$ over the x-axis. Label the image as $A''B''C''$.
See image in BLUE.

c. Rotate $A''B''C''180°$ about the origin. Label the image as $A'''B'''C'''$.
See image in GREEN.



5. Pre-image: $A(3,1), B(-2,1), C(-2,-2)$

Perform the following sequence of transformations:
Reflect the image over the given line (line L), then rotate 180° around the origin, then translate up 5 units.