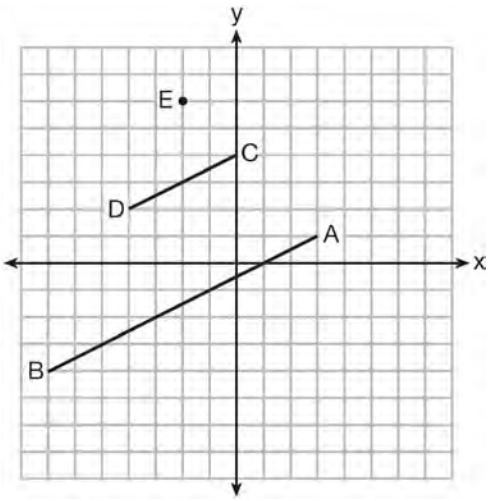
TRANSFORMATIONS

G.SRT.A.1: LINE DILATIONS

146 In the diagram below, $\overline{CD}$ is the image of $\overline{AB}$ after a dilation of scale factor k with center E.



Which ratio is equal to the scale factor k of the dilation?

1 $\frac{EC}{EA}$

2 $\frac{BA}{EA}$

3 $\frac{EA}{BA}$

4 $\frac{EA}{EC}$

147 The equation of line h is $2x + y = 1$. Line m is the image of line h after a dilation of scale factor 4 with respect to the origin. What is the equation of the line m?

1 $y = -2x + 1$

2 $y = -2x + 4$

3 $y = 2x + 4$

4 $y = 2x + 1$

148 The line $y = 2x - 4$ is dilated by a scale factor of $\frac{3}{2}$ and centered at the origin. Which equation represents the image of the line after the dilation?

1 $y = 2x - 4$

2 $y = 2x - 6$

3 $y = 3x - 4$

4 $y = 3x - 6$

149 The line $3y = -2x + 8$ is transformed by a dilation centered at the origin. Which linear equation could be its image?

1 $2x + 3y = 5$

2 $2x - 3y = 5$

3 $3x + 2y = 5$

4 $3x - 2y = 5$

150 Line $y = 3x - 1$ is transformed by a dilation with a scale factor of 2 and centered at $(3,8)$. The line's image is

1 $y = 3x - 8$

2 $y = 3x - 4$

3 $y = 3x - 2$

4 $y = 3x - 1$

151 A line that passes through the points whose coordinates are $(1,1)$ and $(5,7)$ is dilated by a scale factor of 3 and centered at the origin. The image of the line

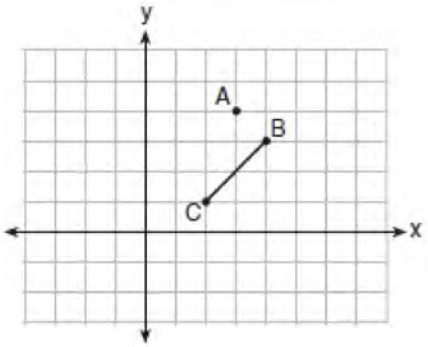
1 is perpendicular to the original line

2 is parallel to the original line

3 passes through the origin

4 is the original line

152 On the graph below, point $A(3,4)$ and $\overline{BC}$ with coordinates $B(4,3)$ and $C(2,1)$ are graphed.



What are the coordinates of *B'* and *C'* after $\overline{BC}$ undergoes a dilation centered at point *A* with a scale factor of 2?

1 $B'(5,2)$ and $C'(1,-2)$
2 $B'(6,1)$ and $C'(0,-1)$
3 $B'(5,0)$ and $C'(1,-2)$
4 $B'(5,2)$ and $C'(3,0)$

153 A three-inch line segment is dilated by a scale factor of 6 and centered at its midpoint. What is the length of its image?

1 9 inches
2 2 inches
3 15 inches
4 18 inches

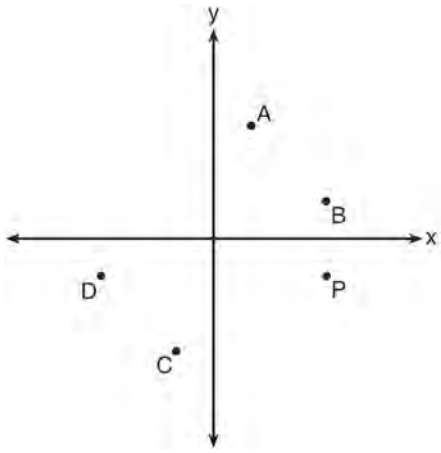
154 Line segment $A'B'$, whose endpoints are $(4,-2)$ and $(16,14)$, is the image of $\overline{AB}$ after a dilation of $\frac{1}{2}$ centered at the origin. What is the length of $\overline{AB}$?

1 5
2 10
3 20
4 40

155 Line ℓ is mapped onto line *m* by a dilation centered at the origin with a scale factor of 2. The equation of line ℓ is $3x - y = 4$. Determine and state an equation for line *m*.

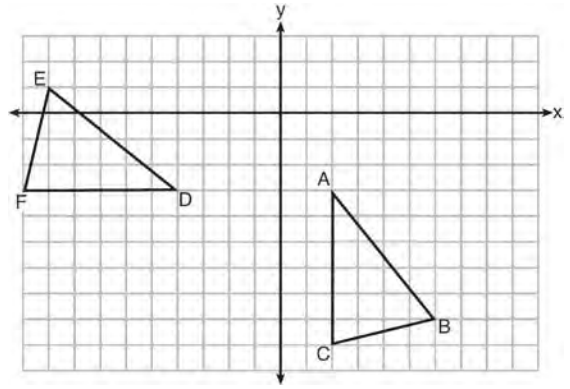
G.CO.A.5: ROTATIONS

156 Which point shown in the graph below is the image of point *P* after a counterclockwise rotation of 90° about the origin?



1 *A*
2 *B*
3 *C*
4 *D*

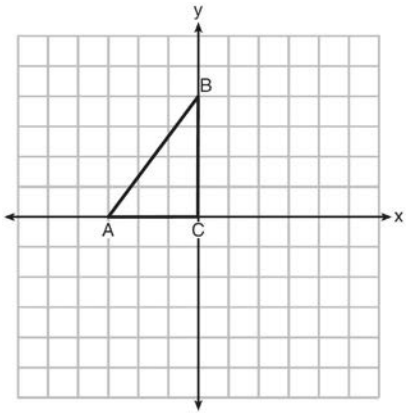
157 The grid below shows $\triangle ABC$ and $\triangle DEF$.



Let $\triangle A'B'C'$ be the image of $\triangle ABC$ after a rotation about point A. Determine and state the location of B' if the location of point C' is $(8,-3)$. Explain your answer. Is $\triangle DEF$ congruent to $\triangle A'B'C'$? Explain your answer.

G.CO.A.5: REFLECTIONS

158 Triangle ABC is graphed on the set of axes below. Graph and label $\triangle A'B'C'$, the image of $\triangle ABC$ after a reflection over the line $x = 1$.

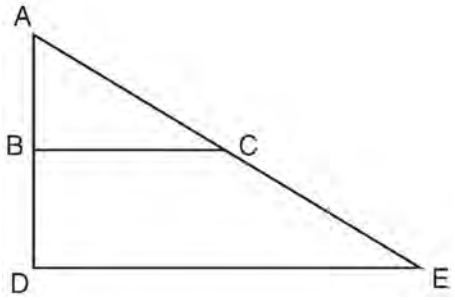


G.SRT.A.2: DILATIONS

159 If $\triangle ABC$ is dilated by a scale factor of 3, which statement is true of the image $\triangle A'B'C'$?

1 $3A'B' = AB$
2 $B'C' = 3BC$
3 $m\angle A' = 3(m\angle A)$
4 $3(m\angle C') = m\angle C$

160 The image of $\triangle ABC$ after a dilation of scale factor k centered at point A is $\triangle ADE$, as shown in the diagram below.



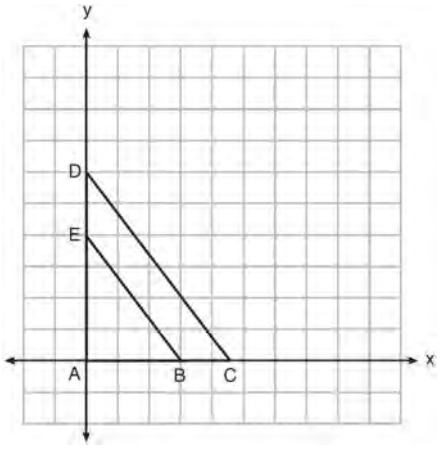
Which statement is always true?

1 $2AB = AD$
2 $\overline{AD} \perp \overline{DE}$
3 $AC = CE$
4 $\overline{BC} \parallel \overline{DE}$

161 A triangle is dilated by a scale factor of 3 with the center of dilation at the origin. Which statement is true?

1 The area of the image is nine times the area of the original triangle.
2 The perimeter of the image is nine times the perimeter of the original triangle.
3 The slope of any side of the image is three times the slope of the corresponding side of the original triangle.
4 The measure of each angle in the image is three times the measure of the corresponding angle of the original triangle.

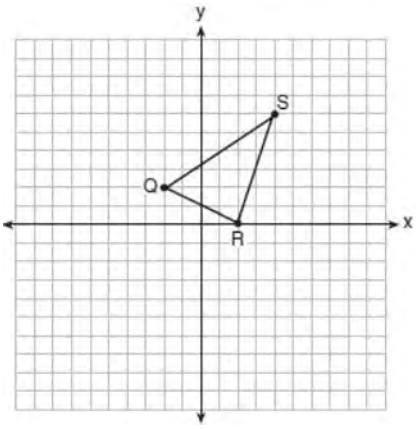
162 In the diagram below, $\triangle ABE$ is the image of $\triangle ACD$ after a dilation centered at the origin. The coordinates of the vertices are $A(0,0)$, $B(3,0)$, $C(4.5,0)$, $D(0,6)$, and $E(0,4)$.



The ratio of the lengths of $\overline{BE}$ to $\overline{CD}$ is

1 $\frac{2}{3}$
2 $\frac{3}{2}$
3 $\frac{3}{4}$
4 $\frac{4}{3}$

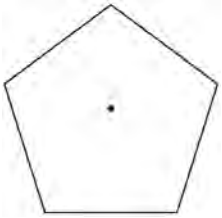
163 Triangle QRS is graphed on the set of axes below.



On the same set of axes, graph and label $\triangle Q'R'S'$, the image of $\triangle QRS$ after a dilation with a scale factor of $\frac{3}{2}$ centered at the origin. Use slopes to explain why $Q'R' \parallel QR$.

G.CO.A.3: MAPPING A POLYGON ONTO ITSELF

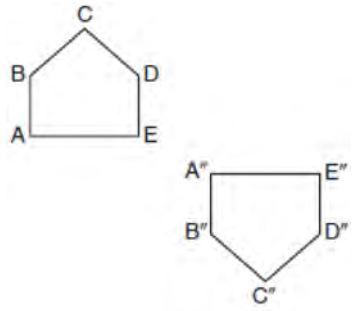
164 A regular pentagon is shown in the diagram below.



If the pentagon is rotated clockwise around its center, the minimum number of degrees it must be rotated to carry the pentagon onto itself is

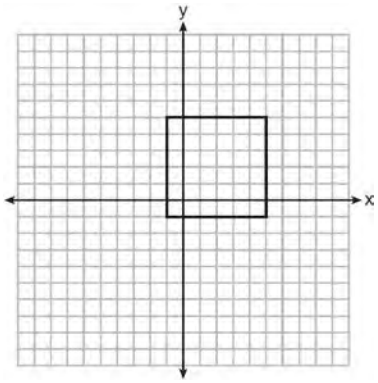
1 54°
2 72°
3 108°
4 360°

165 Identify which sequence of transformations could map pentagon *ABCDE* onto pentagon *A"B"C"D"E"*, as shown below.



1 dilation followed by a rotation
2 translation followed by a rotation
3 line reflection followed by a translation
4 line reflection followed by a line reflection

166 In the diagram below, a square is graphed in the coordinate plane.



A reflection over which line does *not* carry the square onto itself?
1 $x = 5$
2 $y = 2$
3 $y = x$
4 $x + y = 4$

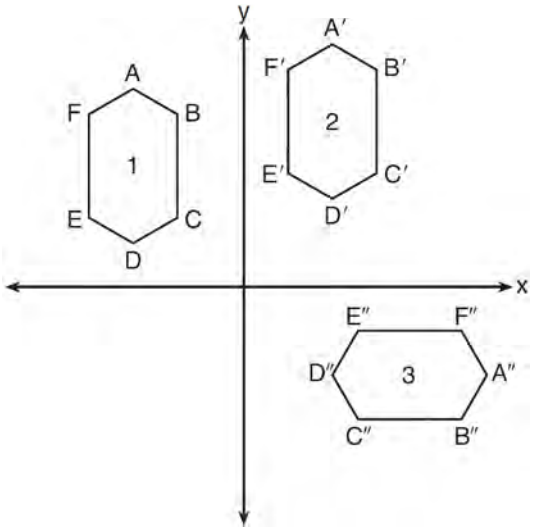
167 A regular hexagon is rotated in a counterclockwise direction about its center. Determine and state the minimum number of degrees in the rotation such that the hexagon will coincide with itself.

168 Which rotation about its center will carry a regular decagon onto itself?
1 54°
2 162°
3 198°
4 252°

169 Which regular polygon has a minimum rotation of 45° to carry the polygon onto itself?
1 octagon
2 decagon
3 hexagon
4 pentagon

G.CO.A.5, G.SRT.A.2: COMPOSITIONS OF TRANSFORMATIONS

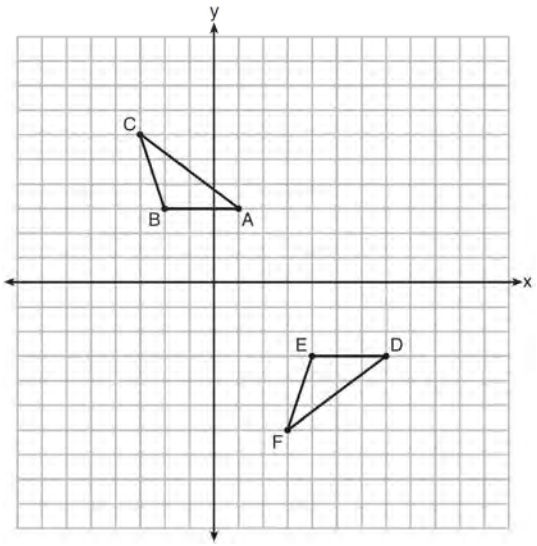
170 In the diagram below, congruent figures 1, 2, and 3 are drawn.



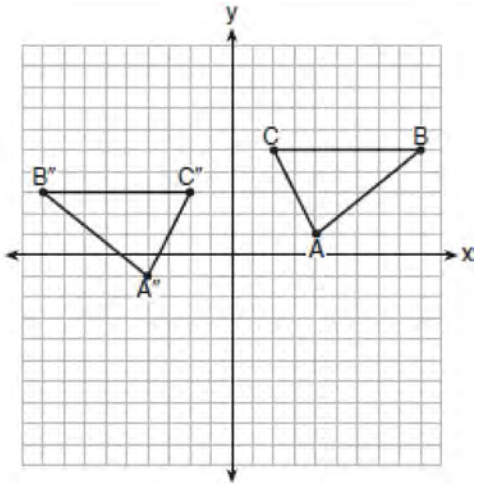
Which sequence of transformations maps figure 1 onto figure 2 and then figure 2 onto figure 3?

1 a reflection followed by a translation
2 a rotation followed by a translation
3 a translation followed by a reflection
4 a translation followed by a rotation

171 Describe a sequence of transformations that will map $\triangle ABC$ onto $\triangle DEF$ as shown below.

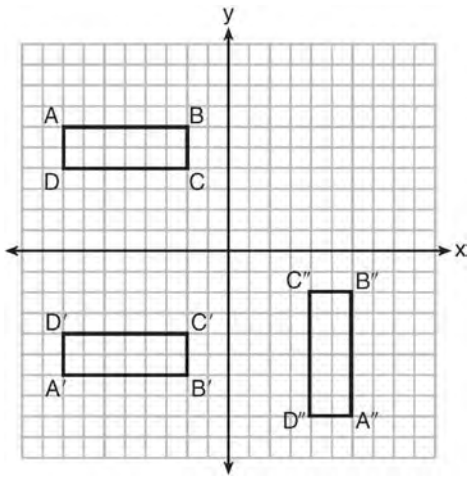


172 The graph below shows $\triangle ABC$ and its image, $\triangle A''B''C''$.



Describe a sequence of rigid motions which would map $\triangle ABC$ onto $\triangle A''B''C''$.

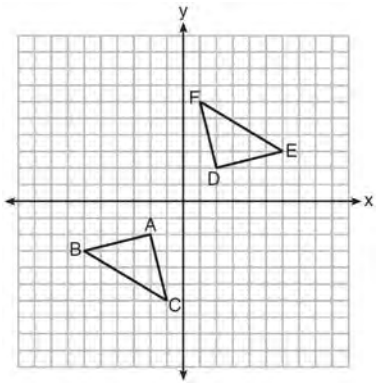
173 A sequence of transformations maps rectangle *ABCD* onto rectangle *A"B"C"D"*, as shown in the diagram below.



Which sequence of transformations maps *ABCD* onto *A'B'C'D'* and then maps *A'B'C'D'* onto *A"B"C"D"*?

1 a reflection followed by a rotation
2 a reflection followed by a translation
3 a translation followed by a rotation
4 a translation followed by a reflection

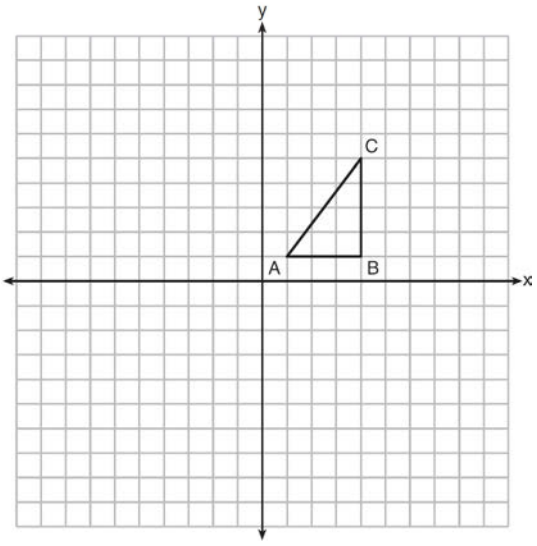
174 Triangle *ABC* and triangle *DEF* are graphed on the set of axes below.



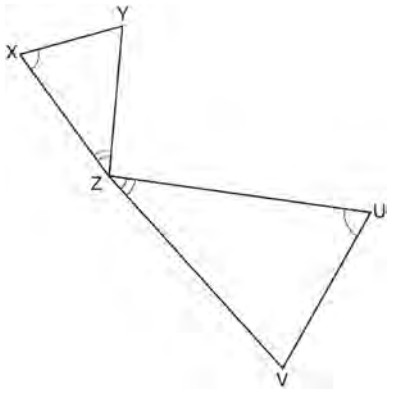
Which sequence of transformations maps triangle *ABC* onto triangle *DEF*?

1 a reflection over the *x*-axis followed by a reflection over the *y*-axis
2 a 180° rotation about the origin followed by a reflection over the line $y = x$
3 a 90° clockwise rotation about the origin followed by a reflection over the *y*-axis
4 a translation 8 units to the right and 1 unit up followed by a 90° counterclockwise rotation about the origin

175 In the diagram below, $\triangle ABC$ has coordinates $A(1,1)$, $B(4,1)$, and $C(4,5)$. Graph and label $\triangle A''B''C''$, the image of $\triangle ABC$ after the translation five units to the right and two units up followed by the reflection over the line $y = 0$.

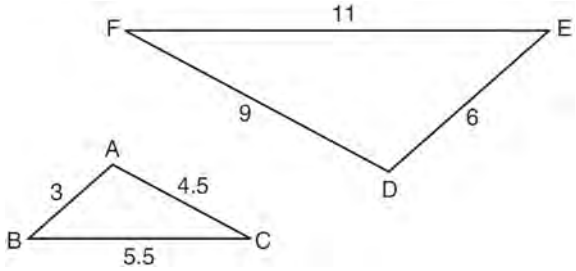


176 In the diagram below, triangles XYZ and UVZ are drawn such that $\angle X \cong \angle U$ and $\angle XZY \cong \angle UZV$.



Describe a sequence of similarity transformations that shows $\triangle XYZ$ is similar to $\triangle UVZ$.

177 In the diagram below, $\triangle DEF$ is the image of $\triangle ABC$ after a clockwise rotation of 180° and a dilation where $AB = 3$, $BC = 5.5$, $AC = 4.5$, $DE = 6$, $FD = 9$, and $EF = 11$.



Which relationship must always be true?

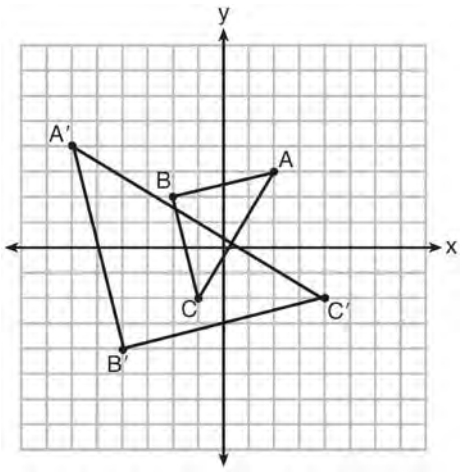
1 $\frac{\text{m}\angle A}{\text{m}\angle D} = \frac{1}{2}$

2 $\frac{\text{m}\angle C}{\text{m}\angle F} = \frac{2}{1}$

3 $\frac{\text{m}\angle A}{\text{m}\angle C} = \frac{\text{m}\angle F}{\text{m}\angle D}$

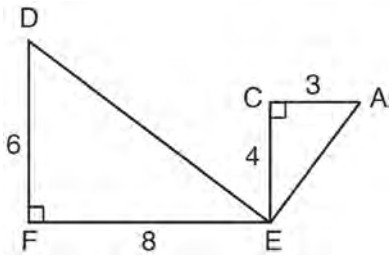
4 $\frac{\text{m}\angle B}{\text{m}\angle E} = \frac{\text{m}\angle C}{\text{m}\angle F}$

178 Which sequence of transformations will map $\triangle ABC$ onto $\triangle A'B'C'$?



1 reflection and translation
2 rotation and reflection
3 translation and dilation
4 dilation and rotation

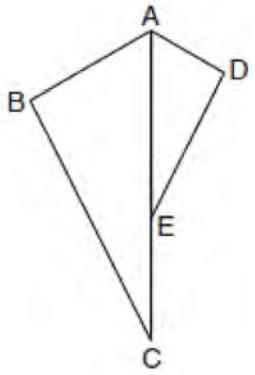
179 Given: $\triangle AEC$, $\triangle DEF$, and $\overline{FE} \perp \overline{CE}$



What is a correct sequence of similarity transformations that shows $\triangle AEC \sim \triangle DEF$?

1 a rotation of 180 degrees about point E followed by a horizontal translation
2 a counterclockwise rotation of 90 degrees about point E followed by a horizontal translation
3 a rotation of 180 degrees about point E followed by a dilation with a scale factor of 2 centered at point E
4 a counterclockwise rotation of 90 degrees about point E followed by a dilation with a scale factor of 2 centered at point E

180 In the diagram below, $\triangle ADE$ is the image of $\triangle ABC$ after a reflection over the line AC followed by a dilation of scale factor $\frac{AE}{AC}$ centered at point A.



Which statement must be true?

1 $m\angle BAC \cong m\angle AED$

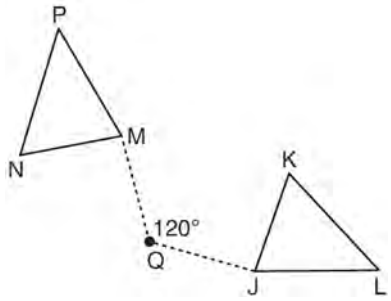
2 $m\angle ABC \cong m\angle ADE$

3 $m\angle DAE \cong \frac{1}{2} m\angle BAC$

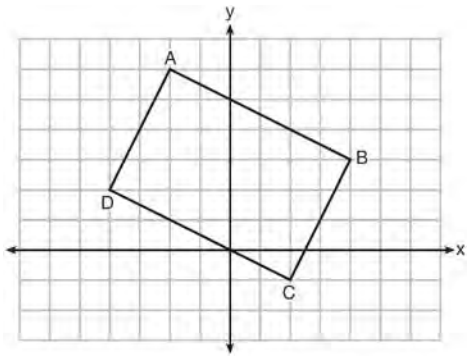
4 $m\angle ACB \cong \frac{1}{2} m\angle DAB$

G.CO.B.6: PROPERTIES OF TRANSFORMATIONS

181 Triangle MNP is the image of triangle JKL after a 120° counterclockwise rotation about point Q. If the measure of angle L is 47° and the measure of angle N is 57°, determine the measure of angle M. Explain how you arrived at your answer.



182 Quadrilateral $ABCD$ is graphed on the set of axes below.



When $ABCD$ is rotated 90° in a counterclockwise direction about the origin, its image is quadrilateral $A'B'C'D'$. Is distance preserved under this rotation, and which coordinates are correct for the given vertex?

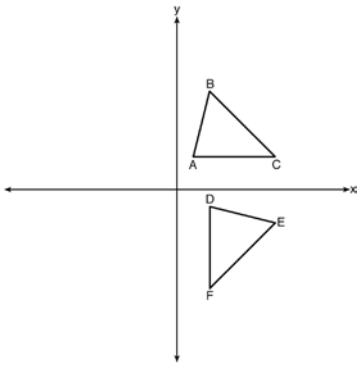
1 no and $C'(1,2)$

2 no and $D'(2,4)$

3 yes and $A'(6,2)$

4 yes and $B'(-3,4)$

183 The image of $\triangle ABC$ after a rotation of 90° clockwise about the origin is $\triangle DEF$, as shown below.



Which statement is true?

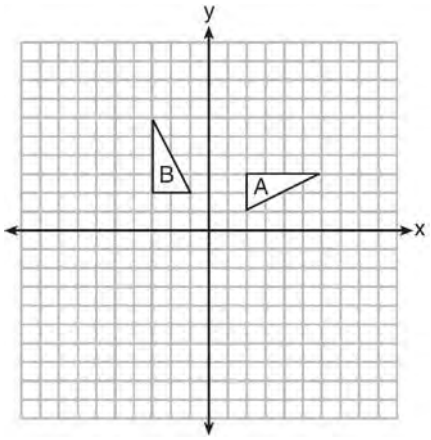
1 $\overline{BC} \cong \overline{DE}$
2 $\overline{AB} \cong \overline{DF}$
3 $\angle C \cong \angle E$
4 $\angle A \cong \angle D$

G.CO.A.2: IDENTIFYING TRANSFORMATIONS

184 The vertices of $\triangle JKL$ have coordinates $J(5,1)$, $K(-2,-3)$, and $L(-4,1)$. Under which transformation is the image $\triangle J'K'L'$ *not* congruent to $\triangle JKL$?

1 a translation of two units to the right and two units down
2 a counterclockwise rotation of 180 degrees around the origin
3 a reflection over the *x*-axis
4 a dilation with a scale factor of 2 and centered at the origin

185 In the diagram below, which single transformation was used to map triangle *A* onto triangle *B*?



1 line reflection
2 rotation
3 dilation
4 translation

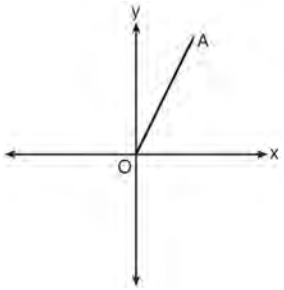
186 If $\triangle A'B'C'$ is the image of $\triangle ABC$, under which transformation will the triangles *not* be congruent?

1 reflection over the *x*-axis
2 translation to the left 5 and down 4
3 dilation centered at the origin with scale factor 2
4 rotation of 270° counterclockwise about the origin

187 Which transformation would *not* always produce an image that would be congruent to the original figure?

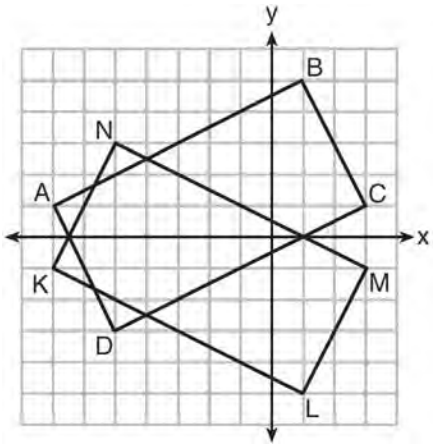
1 translation
2 dilation
3 rotation
4 reflection

188 Which transformation of $\overline{OA}$ would result in an image parallel to $\overline{OA}$?



1 a translation of two units down
2 a reflection over the *x*-axis
3 a reflection over the *y*-axis
4 a clockwise rotation of 90° about the origin

189 On the set of axes below, rectangle *ABCD* can be proven congruent to rectangle *KLMN* using which transformation?



1 rotation
2 translation
3 reflection over the *x*-axis
4 reflection over the *y*-axis

190 Under which transformation would $\triangle A'B'C'$, the image of $\triangle ABC$, *not* be congruent to $\triangle ABC$?
1 reflection over the *y*-axis
2 rotation of 90° clockwise about the origin
3 translation of 3 units right and 2 units down
4 dilation with a scale factor of 2 centered at the origin

G.CO.A.2: ANALYTICAL REPRESENTATIONS OF TRANSFORMATIONS

191 Which transformation would result in the perimeter of a triangle being different from the perimeter of its image?
1 $(x,y) \rightarrow (y,x)$
2 $(x,y) \rightarrow (x,-y)$
3 $(x,y) \rightarrow (4x,4y)$
4 $(x,y) \rightarrow (x+2,y-5)$