

Transformations

Translations

- 1) Using the translation $(x, y) \rightarrow (x - 4, y + 3)$, find the image of the given points.

$$G(-2, 4); G'(-6, 7)$$

$$H(-10, 5); H'(-14, 8)$$

- 2) Segment FG with endpoints $F(0, -3)$ and $G(0, -1)$ is translated 2 units up and 3 units to the left, find the coordinates of F' and G' and write the rule for this transformation.

$$F'(2, -6) \text{ and } G'(2, -4); (x, y) \rightarrow (x + 2, y - 3)$$

- 3) Segment XY with endpoints $X(2, -3)$ and $Y(-3, 1)$ is translated 4 units down and 1 unit to the right, find the coordinates of X' and Y' and write the rule for this transformation.

$$X'(-2, -2) \text{ and } Y'(-7, 2); (x, y) \rightarrow (x - 4, y + 1)$$

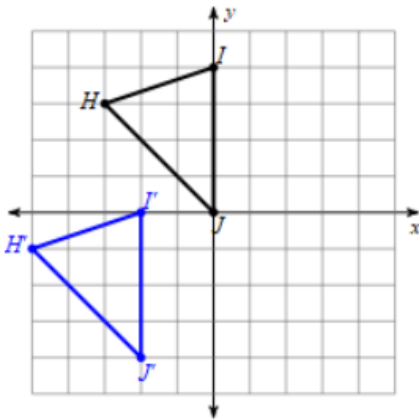
- 4) The vertices of $\triangle JKL$ are $J(-2, 8)$, $K(1, -3)$, and $L(5, 4)$. If $\triangle JKL$ is transformed following the rule $(x, y) \rightarrow (x + 6, y - 1)$, what are the coordinates of the vertices of $\triangle J'K'L'$?

$$J'(-4, 7), K'(7, -4), \text{ and } L'(11, 3)$$

- 5) Maggie transformed $\triangle ABC$ with vertices $A(-3, 5)$, $B(-2, 2)$, and $C(-4, 2)$ onto $\triangle A'B'C'$ with vertices $A'(3, 1)$, $B'(4, -2)$, and $C'(2, -2)$. Write a rule that maps $\triangle ABC$ onto $\triangle A'B'C'$.

$$(x, y) \rightarrow (x + 6, y - 4)$$

- 6) What is the rule that maps $\triangle HIJ$ onto $\triangle H'I'J'$?



- A. $(x, y) \rightarrow (x + 2, y + 4)$
- B. $(x, y) \rightarrow (x - 2, y - 4)$ - correct
- C. $(x, y) \rightarrow (x + 4, y + 2)$
- D. $(x, y) \rightarrow (x - 4, y - 2)$

Reflections

- 7) Segment FG with endpoints $F(0, -3)$ and $G(0, -1)$ is reflected over the x -axis, find the coordinates of F' and G' and write the rule for this transformation.

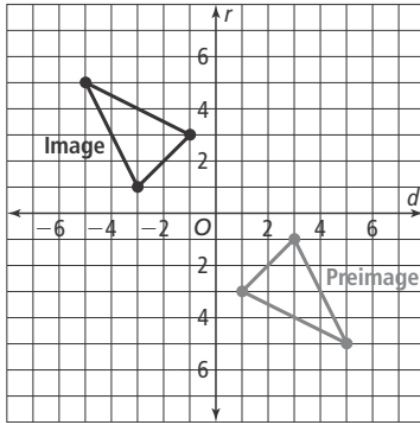
$$F'(0, 3) \text{ and } G'(0, 1); (x, y) \rightarrow (x, -y)$$

- 8) Segment XY with endpoints $X(2, -3)$ and $Y(-3, 1)$ is reflected over the y -axis, find the coordinates of X' and Y' and write the rule for this transformation.

$$X'(-2, -3) \text{ and } Y'(3, 1); (x, y) \rightarrow (-x, y)$$

Transformations

- 9) Segment PQ with endpoints $P(2, -3)$ and $Q(-3, 1)$ is reflected over the line $y = x$, find the coordinates of P' and Q' and write the rule for this transformation.
 $P'(-3, 2)$ and $Q'(1, -3)$; $(x, y) \rightarrow (y, x)$
- 10) Segment TS with endpoints $T(-4, 6)$ and $S(2, -1)$ is reflected over the line $y = -x$, find the coordinates of T' and S' and write the rule for this transformation.
 $P'(-6, 4)$ and $Q'(1, -2)$; $(x, y) \rightarrow (-y, -x)$
- 11) What transformation maps the Preimage onto the Image?



- A. Reflection over the line $y = 0$
- B. Reflection over the line $x = 0$
- C. Reflection over the line $y = x$ - correct
- D. Reflection over the line $y = -x$

Rotations

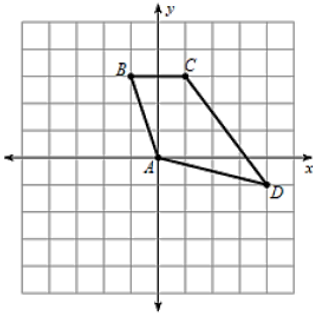
- 12) Segment FG with endpoints $F(1, -3)$ and $G(2, -1)$ is rotated 90° clockwise about the origin, find the coordinates of F' and G' and write the rule for this transformation.
 $F'(-3, -1)$ and $G'(-1, -2)$; $(x, y) \rightarrow (y, -x)$
- 13) Segment XY with endpoints $X(2, -3)$ and $Y(-3, 1)$ is rotated 90° counterclockwise about the origin, find the coordinates of X' and Y' and write the rule for this transformation.
 $X'(3, 2)$ and $Y'(-1, -3)$; $(x, y) \rightarrow (-y, x)$
- 14) Segment PQ with endpoints $P(2, -3)$ and $Q(-3, 1)$ is rotated 180° about the origin, find the coordinates of P' and Q' and write the rule for this transformation.
 $P'(-2, 3)$ and $Q'(3, -1)$; $(x, y) \rightarrow (-x, -y)$
- 15) Segment TS with endpoints $T(-4, 6)$ and $S(2, -1)$ is rotated 270° clockwise about the origin, find the coordinates of T' and S' and write the rule for this transformation.
 $P'(-6, -4)$ and $Q'(1, 2)$; $(x, y) \rightarrow (-y, x)$
- 16) Segment MN with endpoints $M(7, -2)$ and $N(-5, 4)$ is rotated 270° counterclockwise about the origin, find the coordinates of M' and N' and write the rule for this transformation.
 $M'(-2, -7)$ and $N'(4, 5)$; $(x, y) \rightarrow (y, -x)$

Transformations

17) Given triangle ABC with vertices $A(-1, 0)$, $B(-3, -4)$, and $C(-4, -1)$, write the coordinates of its image, triangle $A'B'C'$, after a rotation of 270° clockwise about the origin.

- A. $A'(1, 0)$, $B'(3, 4)$, and $C'(4, 1)$
- B. $A'(-1, 0)$, $B'(-3, 4)$, and $C'(-4, 1)$
- C. $A'(0, 1)$, $B'(4, 3)$, and $C'(1, 4)$
- D. $A'(0, -1)$, $B'(4, -3)$, and $C'(1, -4)$ - correct

18) Quadrilateral $ABCD$ is rotated 90° about the origin. What will be the coordinates of D' ?



- A. $D'(-1, -4)$ - correct
- B. $D'(-4, -1)$
- C. $D'(1, 4)$
- D. $D'(4, 1)$

Dilations

19) What are the coordinates of the image of segment MN with endpoints $M(4, -2)$ and $N(-3, 5)$ after a dilation with scale factor 3 and the origin as the center of dilation? Write the rule for this transformation.

$M'(12, -6)$ and $N'(-9, 15)$; $(x, y) \rightarrow (3x, 3y)$

20) What are the coordinates of the image of segment JK with endpoints $J(4, 0)$ and $K(-12, 3)$ after a dilation with scale factor $\frac{1}{4}$ and the origin as the center of dilation? Write the rule for this transformation.

$J'(1, 0)$ and $K'(-3, \frac{3}{4})$; $(x, y) \rightarrow (\frac{1}{4}x, \frac{1}{4}y)$

21) What are the coordinates of the image of segment CV with endpoints $C(3, 2)$ and $V(1, -6)$ after a dilation with scale factor $\frac{3}{2}$ and the origin as the center of dilation? Write the rule for this transformation.

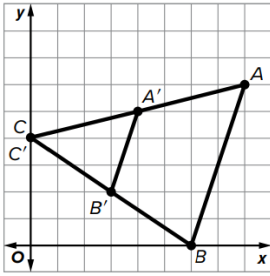
$C'(\frac{9}{2}, 3)$ and $V'(\frac{3}{2}, -9)$; $(x, y) \rightarrow (\frac{3}{2}x, \frac{3}{2}y)$

22) Triangle ABC with vertices $A(-2, 1)$, $B(-2, -1)$, and $C(2, -2)$ is transformed following the rule $(x, y) \rightarrow (2x, 2y)$. What are the coordinates of its image, triangle $A'B'C'$?

- A. $A'(-2, 2)$, $B'(-2, -2)$, and $C'(2, -4)$
- B. $A'(2, -2)$, $B'(2, 2)$, and $C'(-2, 4)$
- C. $A'(-4, 1)$, $B'(-4, -1)$, and $C'(4, -2)$
- D. $A'(-4, 2)$, $B'(-4, -2)$, and $C'(4, -4)$ - correct

Transformations

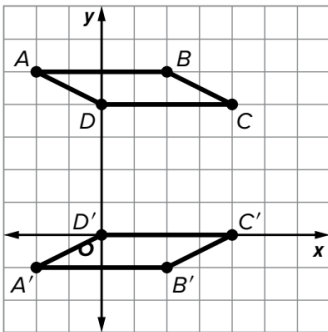
23) Consider $\triangle ABC$ and its image. Which statement describe the dilation?



- A. Dilation centered at the origin with a scale factor of 2
- B. Dilation centered at the origin with a scale factor of $\frac{1}{2}$
- C. Dilation centered at C with a scale factor of 2
- D. Dilation centered at C with a scale factor of $\frac{1}{2}$ – correct

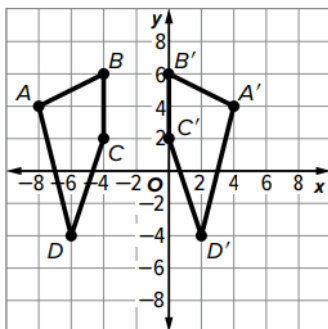
Practice

24) Consider quadrilateral $ABCD$ and its image. Which statement describes the transformation?



- A. Rotation of 180° counterclockwise about the origin.
- B. Reflection over the line $x = 2$.
- C. Translation of 4 units down.
- D. Reflection over the line $y = 2$. - correct

25) Consider quadrilateral $ABCD$ and its image. Which statement describe the transformation?



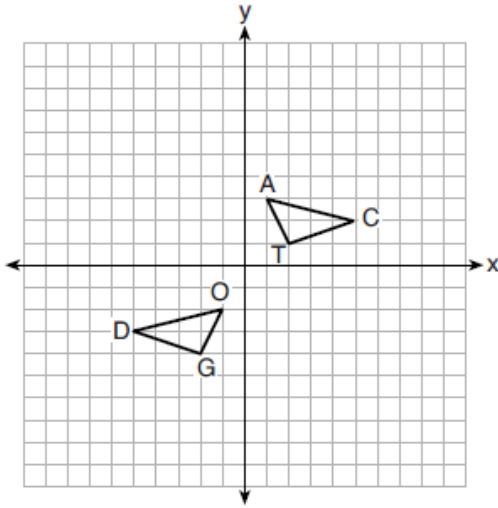
- A. Reflection in the y -axis
- B. Rotation 180° about point C .
- C. Reflection in the line $x = -2$ - correct
- D. Translation of 4 units to the right.

26) Triangle CDE has vertices $C(-3, 5)$, $D(-2, 2)$, and $E(-4, 2)$. If $\triangle CDE$ is transformed by a dilation centered in D with a scale factor of $\frac{1}{4}$ followed by a rotation of 90° clockwise about the origin, what will be the coordinates of the final image of point C after the two transformations?

- A. $(-6, 3)$
- B. $(-4, 4)$
- C. $(-2.25, 2.75)$
- D. $(2.75, 2.25)$ – correct

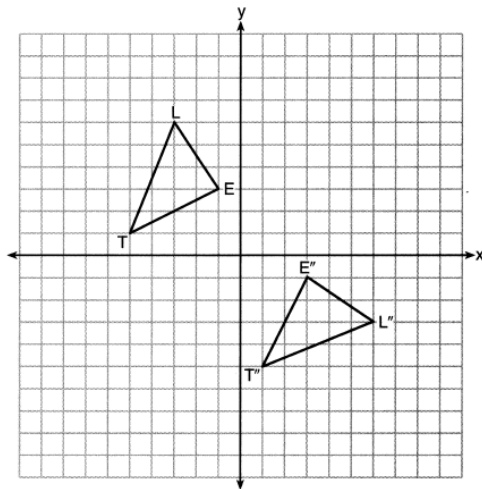
Transformations

27) On the set of axes below, $\triangle DOG \cong \triangle CAT$. Which sequence of transformations maps $\triangle DOG$ onto $\triangle CAT$?



- A. A translation of 5 units down followed by a reflection over the y -axis.
- B. A translation of 5 units up followed by a reflection over the y -axis. - correct
- C. A translation of 6 units to the right followed by a reflection over the x -axis.
- D. A translation of 6 units to the left followed by a reflection over the x -axis.

28) On the set of axes below, $\triangle LET$ and $\triangle L''E''T''$ are graphed in the coordinate plane where $\triangle LET \cong \triangle L''E''T''$. Which sequence of rigid motions maps $\triangle LET$ onto $\triangle L''E''T''$?



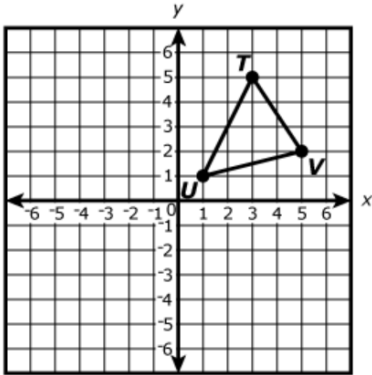
- A. a reflection over the y -axis followed by a reflection over the x -axis.
- B. a rotation of 180° about the origin.
- C. a rotation of 90° counterclockwise about the origin followed by a reflection over the y -axis. - correct
- D. a reflection over the x -axis followed by a rotation of 90° clockwise about the origin.

29) Triangle BAT has vertices $B(2, 1)$, $A(6, 2)$, and $T(3, 6)$. If $\triangle BAT$ is transformed by a rotation of 270° counterclockwise about the origin followed by a translation with rule $(x, y) \rightarrow (x + 3, y + 6)$, what will be the coordinates of the final image of point A after the two transformations?

- A. $(2, -6)$
- B. $(5, 0)$ - correct
- C. $(6, -3)$
- D. $(9, 3)$

Transformations

30) Triangle TUV is shown on this coordinate plane.



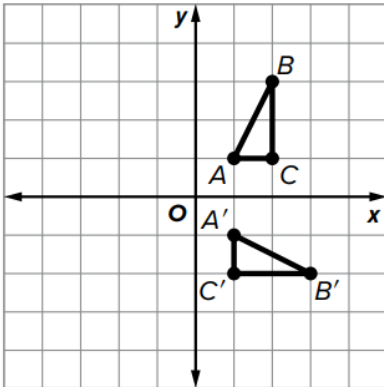
Triangle TUV will be reflected over the x -axis.

The image of triangle TUV will then be translated 2 units up and 1 unit left.

What will be the coordinates of the final image of point V after the two transformations?

- A. $(0, 4)$
- B. $(4, 0)$ - correct
- C. $(4, -6)$
- D. $(-6, 4)$

31) Given $\triangle ABC$ and its image $\triangle A'B'C'$. Which transformation(s) maps $\triangle ABC$ onto $\triangle A'B'C'$? Select All that apply.



- A. Rotation 90° counterclockwise about the origin.
- B. Rotation 90° clockwise about the origin. - correct
- C. $(x, y) \rightarrow (-x, -y)$
- D. Rotation 270° clockwise about the origin.
- E. $(x, y) \rightarrow (-y, x)$
- F. Rotation 270° counterclockwise about the origin. - correct
- G. $(x, y) \rightarrow (y, -x)$ - correct

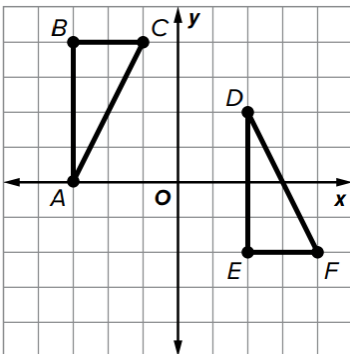
32) The vertices of $\triangle ABC$ are $A(-1, 2)$, $B(3, 3)$, and $C(2, 5)$. What are the vertices of $\triangle A'B'C'$ after rotating $\triangle ABC$ 180° about the origin, then applying the dilation $(x, y) \rightarrow (3x, 3y)$?

$$A' = (3, -6)$$

$$B' = (-9, -9)$$

$$C' = (-6, -15)$$

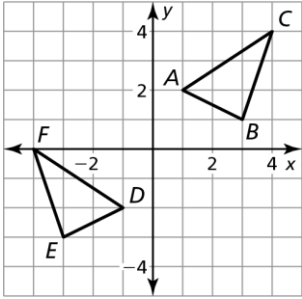
33) Given $\triangle ABC$ and its image $\triangle DEF$. What series of transformations maps $\triangle ABC$ onto $\triangle DEF$?



- A. Rotation 270° clockwise about the origin followed by a reflection over the y -axis.
- B. Reflection over the x -axis followed by a translation 5 units to the right and 2 units up. - correct
- C. Rotation 180° clockwise about the origin followed by a reflection over the x -axis.
- D. Reflection over the line $y = x$ followed by a rotation of 90° clockwise about C .

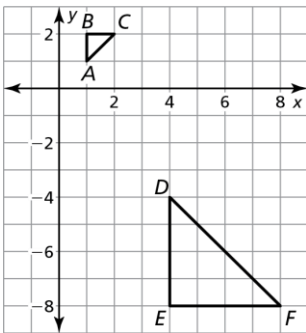
Transformations

34) Describe a congruence transformation that maps $\triangle ABC$ to $\triangle DEF$.



- A. reflection in the x -axis, followed by a translation 4 units down.
- B. reflection in the x -axis, followed by a translation 4 units up.
- C. reflection in the y -axis, followed by a translation 4 units down. — correct
- D. reflection in the y -axis, followed by a translation 4 units up.

35) Describe a similarity transformation that maps $\triangle ABC$ to $\triangle DEF$.



- A. reflection in the x -axis, followed by a dilation with a scale factor of 4. — correct
- B. reflection in the x -axis, followed by a dilation with a scale factor of $\frac{1}{4}$.
- C. reflection in the y -axis, followed by a dilation with a scale factor of 4.
- D. reflection in the y -axis, followed by a dilation with a scale factor of $\frac{1}{4}$.

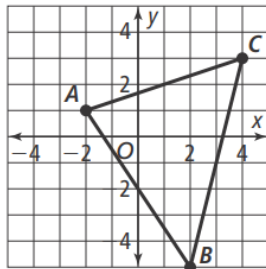
36) The vertices of $\triangle PQS$ are $P(7, 6)$, $Q(5, -3)$, and $S(-4, -8)$. What are the vertices of $\triangle P'Q'S'$ after dilating from the origin by a scale factor of 3, then translating up 2 units and left 9 units?

$P' =$ (12, 20)

 $Q' =$ (6, -7)

 $S' =$ (-21, -22)

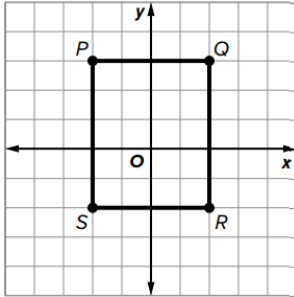
37) Given $\triangle ABC$ determine the coordinates of $\triangle A'B'C'$ after a translation up 1 unit and left 2 units, followed by a dilation with center at the origin and scale factor 0.5.



- A. $A'(-2, 1)$, $B'(0, -2)$, and $C'(1, 2)$ — correct
- B. $A'(-2, 2)$, $B'(0, -4)$, and $C'(1, 4)$
- C. $A'(-4, 2)$, $B'(0, 6)$, and $C'(2, 4)$
- D. $A'(-8, 4)$, $B'(0, 12)$, and $C'(4, -8)$

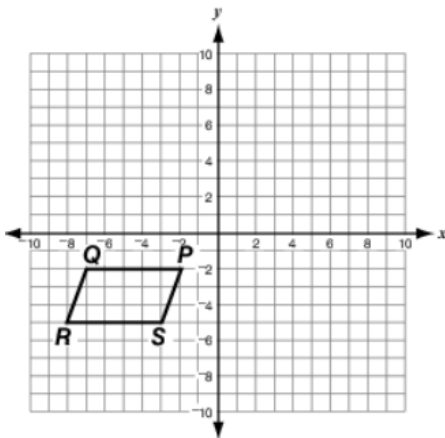
Transformations

38) Which transformations will map quadrilateral $PQRS$ onto itself. Select All that apply.



- A. Reflection over the x -axis.
- B. Rotation 180° clockwise about the origin.
- C. Reflection over the line $y = 0.5$. – correct
- D. Rotation 90° clockwise about the origin.
- E. Reflection over the y -axis. – correct
- F. Rotation 90° counterclockwise about the origin.

39) Parallelogram $PQRS$ is shown on the coordinate plane below. Which of these transformations will take parallelogram $PQRS$ onto itself?



- A. a reflection over the line $x = -5$
- B. a reflection over the line $y = -5$
- C. a rotation of 180° clockwise about the center of the parallelogram.
- D. a rotation of 360° counterclockwise about the center of the parallelogram. – correct

40) Which of these transformations map the figure onto itself? Select All that apply.

- A. An equilateral triangle is reflected across a line coinciding with one of its sides.
- B. A square is reflected across its diagonal. – correct
- C. A square is rotated 90° clockwise about its center. – correct
- D. An isosceles trapezoid is rotated 180° about its center.
- E. A regular hexagon is rotated 45° counterclockwise about its center.

41) Triangle CAT has vertices $C(-9, 9)$, $A(-3, 3)$, and $T(-6, 0)$. If $\triangle BUG$ has vertices $B(-3, 3)$, $U(-1, 1)$, and $G(-2, 0)$. Is $\triangle CAT$ similar to $\triangle BUG$? If so, what transformation maps $\triangle CAT$ onto $\triangle BUG$?

- A. No, dilation centered at the origin with scale factor of 3.
- B. No, dilation centered at the origin with scale factor of $\frac{1}{3}$.
- C. Yes, dilation centered at the origin with scale factor of 3.
- D. Yes, dilation centered at the origin with scale factor of $\frac{1}{3}$. – correct

Transformations

42) The description of a sequence of transformations on a coordinate plane is shown.

A parallelogram is dilated by a scale factor of $\frac{1}{3}$ with the origin as the center of dilation. Then, it is reflected across the x -axis.

Which statements is true?

- A. This sequence of transformations will preserve only the length of the sides.
- B. This sequence of transformations preserves only angle measure. – correct
- C. This sequence of transformations preserves neither distance nor angle measure.
- D. This sequence of transformations preserves both distance and angle measure.

43) Triangle LKJ is transformed on a coordinate plane to obtain triangle $L'K'J'$. If the length of the corresponding sides is equal and the corresponding angles have the same measure, which of the following statements could be true? Select All that apply.

- A. Triangle $L'K'J'$ is the image of $\triangle LKJ$ after a translation of 10 units up. – correct
- B. Triangle $L'K'J'$ is the image of $\triangle LKJ$ after a dilation with scale factor of -1 followed by a 180° rotation. – correct
- C. Triangle $L'K'J'$ is the image of $\triangle LKJ$ after a dilation with scale factor 10 followed by a translation of 1 unit down.
- D. Triangle $L'K'J'$ is the image of $\triangle LKJ$ after a reflection over the line $y = 2x$ followed by a rotation of 90° about one of its vertices. – correct
- E. Triangle $L'K'J'$ is the image of $\triangle LKJ$ after a reflection over the line $y = -x$ followed by a dilation with scale factor of 0.3.

44) In which case does the transformation of $\triangle QRS$ result in an image $\triangle DEF$ where $\angle Q \cong \angle D$, $\angle R \cong \angle E$, $\angle S \cong \angle F$, and $\frac{QR}{DE} = \frac{QS}{DF} = \frac{RS}{EF} \neq 1$?

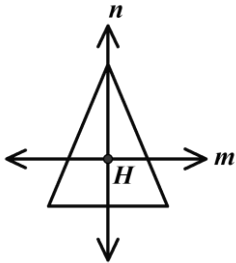
- A. a translation of 6 units to the left and 8.5 units up followed by a reflection over the line $y = 2x$
- B. a reflection over the line $y = -2x$ followed by a translation of 6.5 units to the right and 3.5 units down
- C. a rotation of 45° clockwise about vertex A followed by a dilation by a scale factor of 0.95 about the origin – correct
- D. a dilation by a scale factor of 1 about the origin followed by a rotation of 45° clockwise about vertex A

45) Select all the transformations that preserve both distance and angle measure.

- A. Reflection across the line $y = x$. – correct
- B. Translation of 3 units up. – correct
- C. Translation of 3 units up followed by a dilation with scale factor of 3 about point $(0, 0)$.
- D. Reflection across the line $y = x$ followed by a dilation with scale factor of -1 about point $(2, 3)$. – correct
- E. Reflection across the line $y = -x$ followed by a dilation with scale factor of -0.5 about point $(1, 1)$.

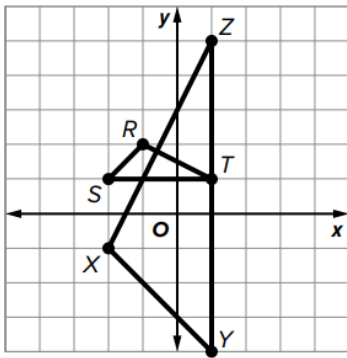
Transformations

- 46) The figure below shows two perpendicular lines n and m intersecting at point H in the interior of an isosceles triangle. Line n bisects the base of the triangle. Which transformation will always carry the figure onto itself? Select All that apply.



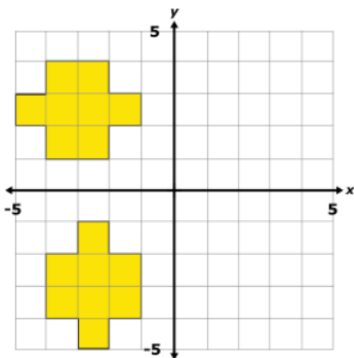
- A. a reflection across line m .
- B. a reflection across line n . – correct
- C. a rotation of 90° clockwise about point H .
- D. a rotation of 180° clockwise about point H .
- E. a rotation of 270° clockwise about point H .
- F. a rotation of 360° clockwise about point H . – correct

- 47) Given $\triangle RST$ and $\triangle XYZ$. Which sequence of transformations shows $\triangle RST \sim \triangle XYZ$?



- A. A dilation centered at the origin with scale factor of $\frac{1}{3}$ followed by a rotation of 270° counterclockwise about point T .
- B. A dilation centered at the origin with scale factor of 3 followed by a rotation of 270° counterclockwise about point T .
- C. A rotation of 270° clockwise about the origin followed by a dilation centered at R with scale factor of 3. – correct
- D. A rotation of 270° clockwise about the origin followed by a dilation centered at R with scale factor of $\frac{1}{3}$.

- 48) Two figures are shown below.



Which of the following statements correctly explains whether or not the two figures are congruent?

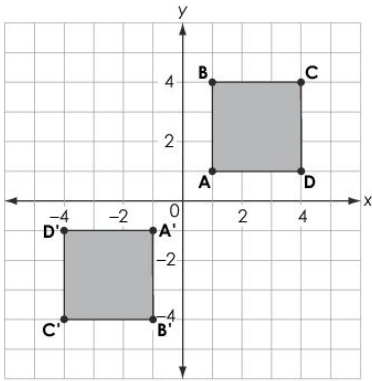
- A. The two figures are not congruent since the two figures are oriented differently.
- B. The two figures are congruent since there is a rotation that carries one figure onto the other. – correct
- C. The two figures are congruent since there is a reflection that carries one figure onto the other.
- D. The two figures are not congruent since there is no translation that carries one figure onto the other.

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49) Which transformation preserves both distance and angle measure?

- A. $(x, y) \rightarrow (2x - 4, y - 6)$
- B. $(x, y) \rightarrow (2x - 4, 2y - 6)$
- C. $(x, y) \rightarrow (-2y + 4, x - 6)$
- D. $(x, y) \rightarrow (-y + 4, x - 6)$ – correct

50) Square $ABCD$ is transformed to create the image $A'B'C'D'$, as shown in the figure below.



Select all the transformations that could have been performed.

- A. a reflection across the line $y = x$
- B. a reflection across the line $y = -x$
- C. a rotation of 180 degrees clockwise about the origin – correct
- D. a reflection across the x -axis, and then a reflection across the y -axis – correct
- E. a rotation of 270 degrees counterclockwise about the origin, and then a reflection across the x -axis