

8.G.1a

SELECTED RESPONSE

Select the correct answer.

1. Point A is located at $(-4, 2)$, and point B is located at $(-1, 2)$. What is the length of the image of \overline{AB} when \overline{AB} is translated 5 units right and 2 units down?

- (A) 2
- (B) 3
- (C) 5
- (D) 8

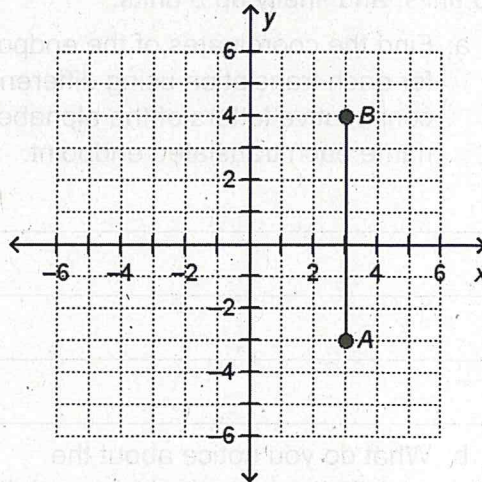
2. Point A is located at $(5, -5)$, and point B is located at $(0, -5)$. \overline{AB} is rotated counterclockwise 90° about the origin. What are the coordinates of points A' and B' , the images of points A and B after the rotation?

- (A) $A'(-5, 0); B'(-5, -5)$
- (B) $A'(-5, -5); B'(-5, 0)$
- (C) $A'(5, 5); B'(5, 0)$
- (D) $A'(5, 0); B'(5, 5)$

\overline{AB} has endpoints $A(-2, 4)$ and $B(-7, 4)$. Match each transformation of \overline{AB} with the endpoints of the corresponding image $\overline{A'B'}$.

- _____ 4. Reflection across x-axis
- _____ 5. Reflection across y-axis
- _____ 6. Clockwise rotation 90° about the origin
- _____ 7. Translation 4 units to the right
- _____ 8. Translation 2 units down

3. The graph below shows \overline{AB} . What is the length of $\overline{A'B'}$, which is the reflection of \overline{AB} across the y-axis?



- (A) 1
- (B) 3
- (C) 6
- (D) 7

- A $A'(2, 4)$ and $B'(-7, 4)$
- B $A'(2, 4)$ and $B'(-3, 4)$
- C $A'(-2, -4)$ and $B'(-7, -4)$
- D $A'(2, 4)$ and $B'(7, 4)$
- E $A'(-4, -2)$ and $B'(-4, -7)$
- F $A'(-2, 2)$ and $B'(-7, 2)$
- G $A'(-2, 4)$ and $B'(-7, 4)$
- H $A'(4, 2)$ and $B'(4, 7)$

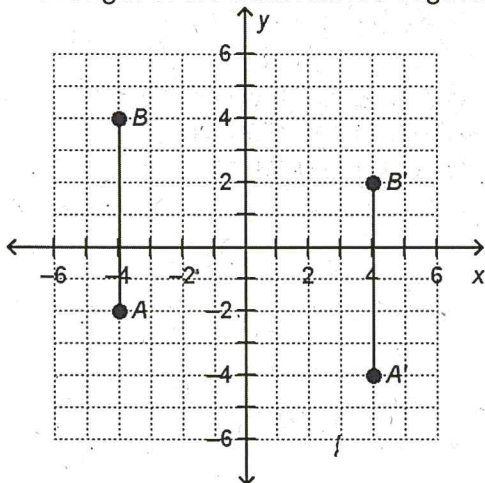
CONSTRUCTED RESPONSE

9. The endpoints of \overline{AB} are $A(-8, -3)$ and $B(-5, -3)$. The segment is translated right 3 units, then down 5 units, then left 3 units, and finally up 5 units.

a. Find the coordinates of the endpoints for each translation using different consecutive letters of the alphabet to name each translated endpoint.

b. What do you notice about the coordinates after the last translation?

10. The graph below shows \overline{AB} . Gale rotates \overline{AB} clockwise 90° about the origin and then translates the result 2 units down. He calls this $\overline{A'B'}$, which is also shown on the coordinate plane. Is Gale's work correct? If not, state what transformations Gale must have performed, and then draw the correct transformed segment. What do you notice about the orientation and length of the transformed segment?



11. \overleftrightarrow{AB} is a horizontal line passing through the point $(0, 3)$. If \overleftrightarrow{AB} is reflected across the x -axis, what point on the y -axis, if any, will it pass through? Is the image of \overleftrightarrow{AB} horizontal, vertical, or neither?

12. The equation of \overleftrightarrow{AB} is $x = -2$.

a. If \overleftrightarrow{AB} is rotated 90° clockwise about the origin, what is the equation of the resulting line?

b. If \overleftrightarrow{AB} is rotated 180° clockwise about the origin, what is the equation of the resulting line?

13. The endpoints of \overline{AB} are $A(-a, -b)$ and $B(-a, c)$ for positive numbers $a, b,$ and c .
- a. What are the endpoints of the image of \overline{AB} after a reflection across the y -axis?

b. What are the endpoints of the transformed segment from part a after a 90° counterclockwise rotation about the origin?

c. What are the endpoints of the transformed segment from part b after a translation $2a$ units down?

d. For what rotation of \overline{AB} is the image the same as the transformed segment from part c?

8.G.1b

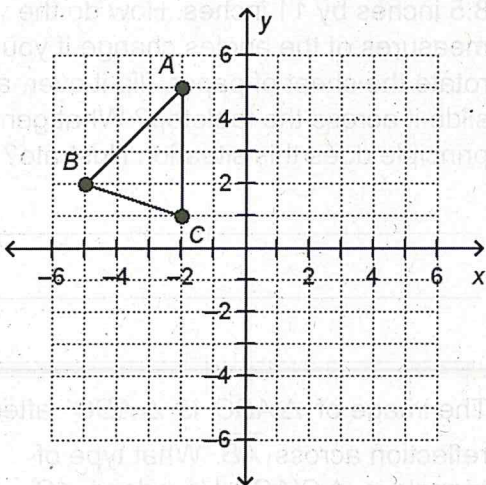
SELECTED RESPONSE

Select the correct answer.

1. In $\triangle ABC$, $m\angle A = 40^\circ$, $m\angle B = 90^\circ$, and $m\angle C = 50^\circ$. If the triangle is rotated 90° clockwise about a point, what is the measure of the image of $\angle A$?

- (A) 40°
- (B) 50°
- (C) 90°
- (D) 180°

2. If $m\angle BAC = 45^\circ$, $m\angle ACB = 72^\circ$, and $\triangle ABC$ undergoes the transformation $(x, y) \rightarrow (x, -y)$, what is the measure of the image of $\angle ABC$?

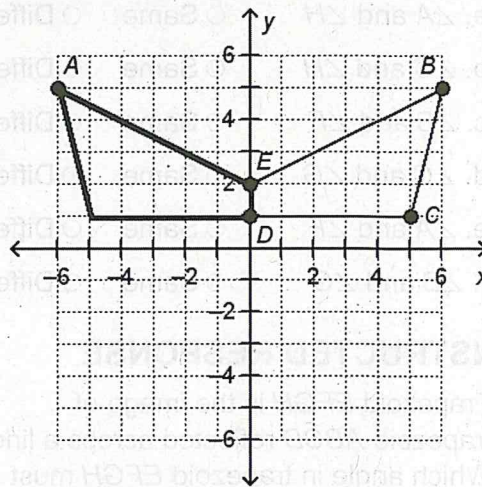


- (A) 45°
- (B) 63°
- (C) 72°
- (D) 180°

3. Quadrilateral $WXYZ$ is the image of quadrilateral $ABCD$ translated 9 units left and 4 units up. If you know $m\angle A$, what other angle do you know the measure of?

- (A) $\angle W$
- (B) $\angle X$
- (C) $\angle Y$
- (D) $\angle Z$

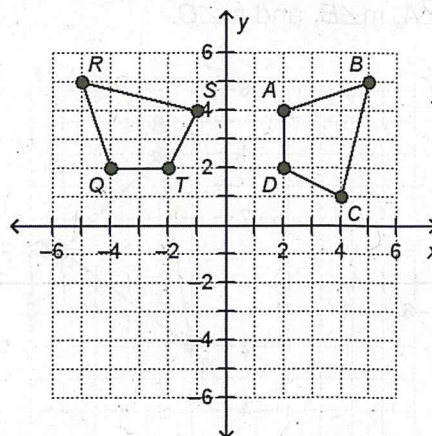
4. Seth is designing a symmetrical logo for his store. He draws half of the logo, which is shown in the second quadrant below. He then reflects that half of the logo across the y -axis to finish it. Which angle in the reflection has the same measure as $\angle A$?



- (A) $\angle B$
- (B) $\angle C$
- (C) $\angle D$
- (D) $\angle E$

Select all correct answers.

5. Quadrilateral $QRST$ is the image of quadrilateral $ABCD$ after the transformation $(x, y) \rightarrow (-y, x)$ is applied. Which angles have the same measure?



- (A) $\angle A$ and $\angle T$
- (B) $\angle D$ and $\angle T$
- (C) $\angle B$ and $\angle R$
- (D) $\angle C$ and $\angle Q$
- (E) $\angle A$ and $\angle Q$
- (F) $\angle B$ and $\angle S$
- (G) $\angle C$ and $\angle S$
- (H) $\angle D$ and $\angle R$

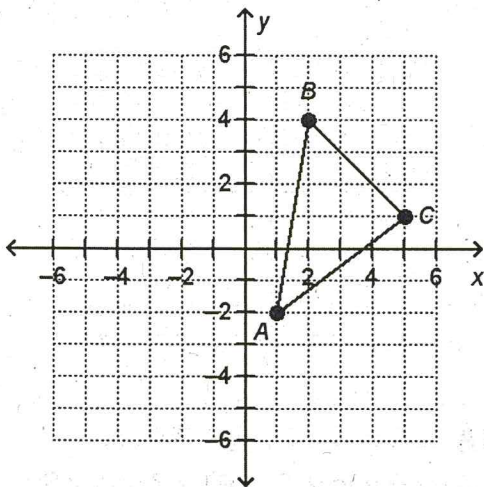
Select the correct answer for each lettered part.

6. No two angles of $\triangle ABC$ have the same measure. $\triangle FGH$ is the image of $\triangle ABC$ after being translated 5 units to the right and 8 units down. For each pair of angles, determine whether the angles have the same measure.
- a. $\angle A$ and $\angle H$ Same Different
- b. $\angle C$ and $\angle H$ Same Different
- c. $\angle B$ and $\angle F$ Same Different
- d. $\angle C$ and $\angle G$ Same Different
- e. $\angle A$ and $\angle F$ Same Different
- f. $\angle B$ and $\angle G$ Same Different

CONSTRUCTED RESPONSE

7. Trapezoid $EFGH$ is the image of trapezoid $ABCD$ reflected across a line. Which angle in trapezoid $EFGH$ must have the same measure as $\angle B$? As $\angle C$? Explain.
- _____

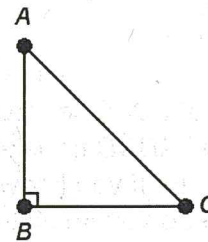
8. $\triangle DEF$ is the image of $\triangle ABC$ after the transformation $(x, y) \rightarrow (-x, y)$. Draw $\triangle DEF$ on the coordinate plane and find $m\angle D$, $m\angle E$, and $m\angle F$ in terms of $m\angle A$, $m\angle B$, and $m\angle C$.



9. Patricia is painting sailboats on her wall using stencils. The stencil for the sail is a right triangle, $\triangle ABC$, where $m\angle A = 52^\circ$, $m\angle B = 90^\circ$, and $m\angle C = 38^\circ$. Patricia paints one sail on the wall and moves the stencil 8 inches to the right. If she paints a second sail in that spot, what will the measures of the angles be? Let $\triangle A'B'C'$ represent the second sail. What general principle does this situation illustrate?
- _____
- _____
- _____

10. Consider a standard sheet of paper, which is a rectangle that measures 8.5 inches by 11 inches. How do the measures of the angles change if you rotate the sheet of paper, flip it over, and slide it across the tabletop? What general principle does this situation illustrate?
- _____
- _____
- _____

11. The image of $\triangle ABC$ is $\triangle ABC'$ after a reflection across \overline{AB} . What type of triangle is $\triangle C'AC$? How does $\angle C'$ compare to $\angle C$? How does $\angle C'AC$ compare to $\angle BAC$? Justify your answers.

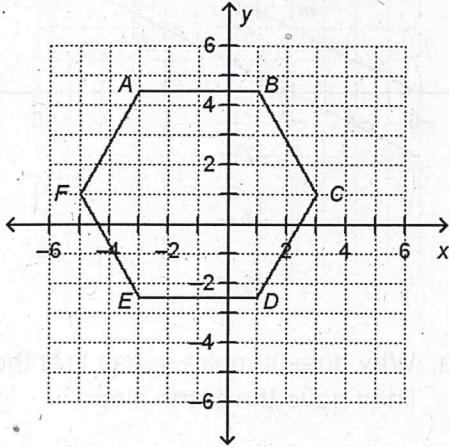


8.G.1c

SELECTED RESPONSE

Select the correct answer.

1. In the regular hexagon shown, the images of which sides are NOT parallel after the hexagon is reflected across the y-axis?



- (A) \overline{AB} and \overline{DE}
- (B) \overline{EF} and \overline{BC}
- (C) \overline{CD} and \overline{EF}
- (D) \overline{AF} and \overline{CD}

2. A regular octagon is rotated 180° counterclockwise about the origin. How many pairs of sides are parallel in the image?

- (A) 1
- (B) 2
- (C) 3
- (D) 4

3. The image of pentagon $ABCDE$ after it is translated right 8 units and up 3 units is pentagon $QRSTU$. If sides \overline{BC} and \overline{AE} are parallel in $ABCDE$ and there are no other parallel sides, which sides in the image are parallel?

- (A) \overline{RS} and \overline{QU}
- (B) \overline{QR} and \overline{ST}
- (C) \overline{RS} and \overline{TU}
- (D) \overline{ST} and \overline{QU}

4. Quadrilateral $WXYZ$ is the image of quadrilateral $ABCD$ after it is rotated 90° clockwise about the origin and then translated left 3 units. If sides \overline{WZ} and \overline{XY} are parallel in quadrilateral $WXYZ$, which sides must be parallel in the original quadrilateral?

- (A) \overline{AB} and \overline{AD}
- (B) \overline{BC} and \overline{AD}
- (C) \overline{CD} and \overline{BC}
- (D) \overline{AB} and \overline{CD}

Select all correct answers.

5. The translation $(x, y) \rightarrow (x + 12, y)$ is performed on rectangle $ABCD$ drawn on a coordinate plane. Which of the following sides of the image are parallel after the translation?

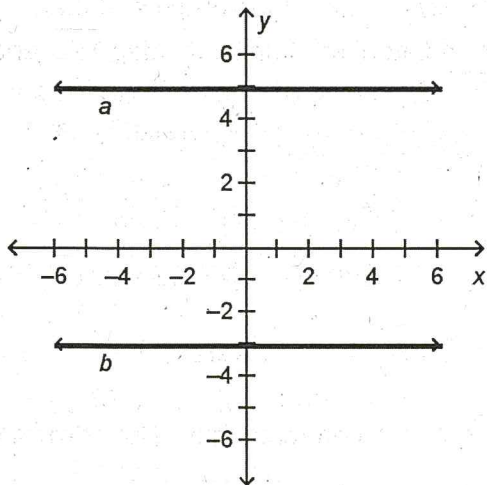
- (A) The images of \overline{AB} and \overline{BC}
- (B) The images of \overline{BC} and \overline{CD}
- (C) The images of \overline{AB} and \overline{CD}
- (D) The images of \overline{AD} and \overline{CD}
- (E) The images of \overline{AB} and \overline{AD}
- (F) The images of \overline{AD} and \overline{BC}

CONSTRUCTED RESPONSE

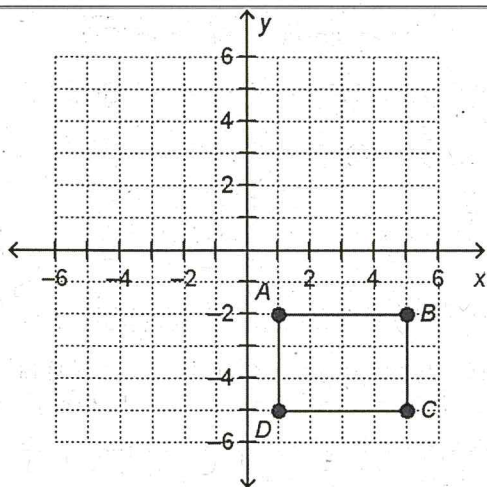
6. The transformation $(x, y) \rightarrow (x, -y)$ is performed on rhombus $ABCD$ drawn on a coordinate plane. Which sides of the image are parallel? Explain.

7. Some bookcases have adjustable shelves. If two shelves on such a bookcase are each moved up 2 inches, are they still parallel? Would they still be parallel if they were moved down 2 inches instead? What does this illustrate about vertical translations of parallel lines?

8. Lines a and b are horizontal and therefore parallel. Reflect these lines across the x -axis. What can you say about the images of lines a and b ?

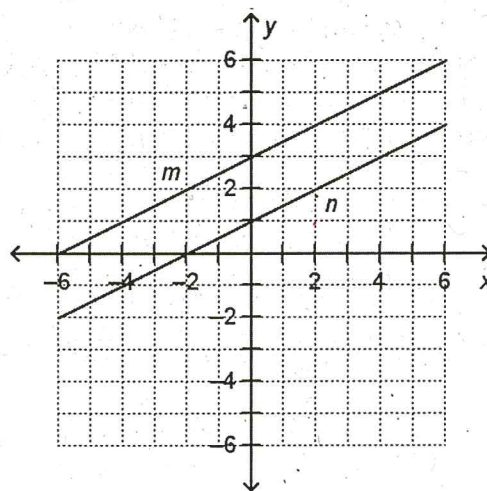


9. Rectangle $ABCD$ is shown.



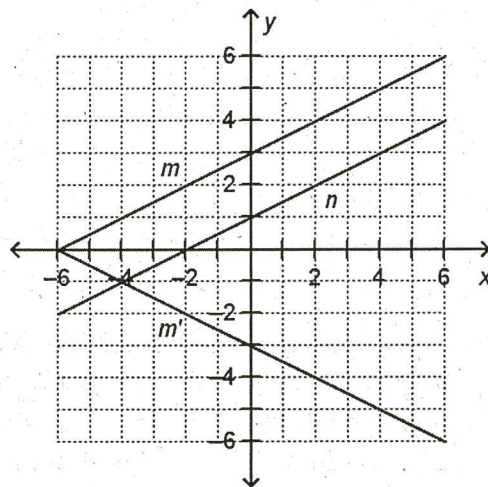
- Which pairs of sides of the rectangle are parallel?
-
- The translation $(x, y) \rightarrow (x - 4, y + 7)$ is applied to $ABCD$. On the coordinate plane above, draw the image of $ABCD$ and label it as $A'B'C'D'$.
- What pairs of sides from $A'B'C'D'$ are parallel? Explain.

10. Lines m and n , shown below, are parallel. The equations of lines m and n are $y = \frac{1}{2}x + 3$ and $y = \frac{1}{2}x + 1$, respectively.



- Why does it make sense that the lines have the same slope?

- Line m' is the image of line m after the transformation $(x, y) \rightarrow (x, -y)$. Draw n' , the image of line n after the same transformation.

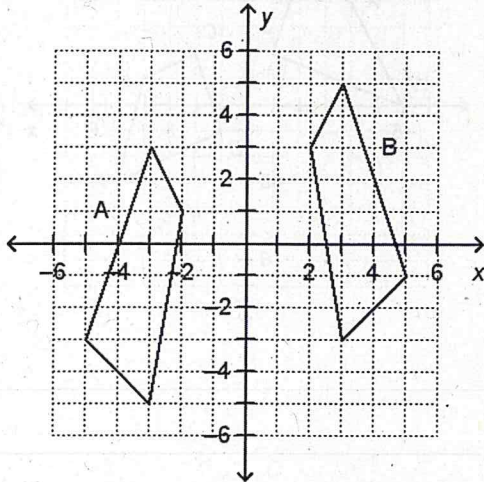


- What are the equations of line m' and line n' ?
-
- Are lines m' and n' parallel? Explain.
-

8.G.2**SELECTED RESPONSE**

Select the correct answer.

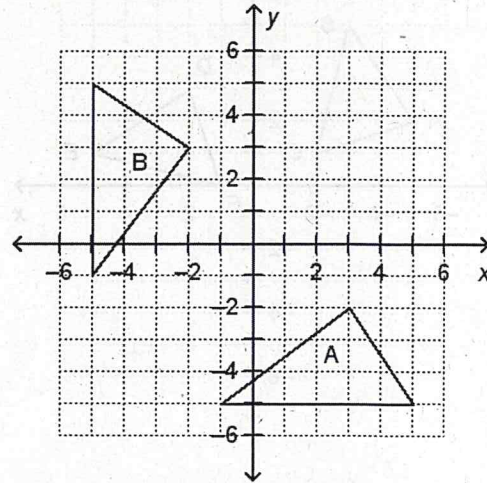
1. Figure A is congruent to figure B. What sequence of transformations maps figure A to figure B?



- Ⓐ $(x, y) \rightarrow (x, -y)$ followed by $(x, y) \rightarrow (x, y + 2)$
- Ⓑ $(x, y) \rightarrow (-x, y)$ followed by $(x, y) \rightarrow (x, y + 2)$
- Ⓒ $(x, y) \rightarrow (x, y - 2)$ followed by $(x, y) \rightarrow (-x, y)$
- Ⓓ $(x, y) \rightarrow (x, y - 2)$ followed by $(x, y) \rightarrow (x, -y)$
2. Which set of vertices describes a triangle that is the result of performing a sequence of translations, reflections, and/or rotations on the triangle with vertices $(-5, 2)$, $(-2, 2)$, $(-3, 6)$ and is therefore congruent to the triangle?
- Ⓐ $(2, 2)$, $(3, 6)$, $(6, 2)$
- Ⓑ $(-6, -1)$, $(-6, -4)$, $(-2, -3)$
- Ⓒ $(0, 0)$, $(3, 0)$, $(2, 3)$
- Ⓓ $(2, -1)$, $(5, -2)$, $(3, -6)$

Select all correct answers.

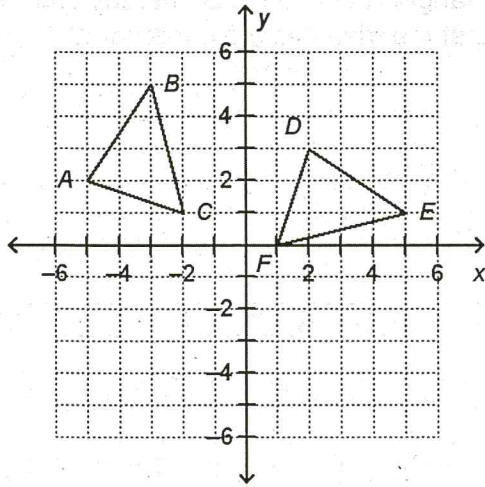
3. Which sequences of transformations map triangle A to triangle B, thereby showing that the triangles are congruent?



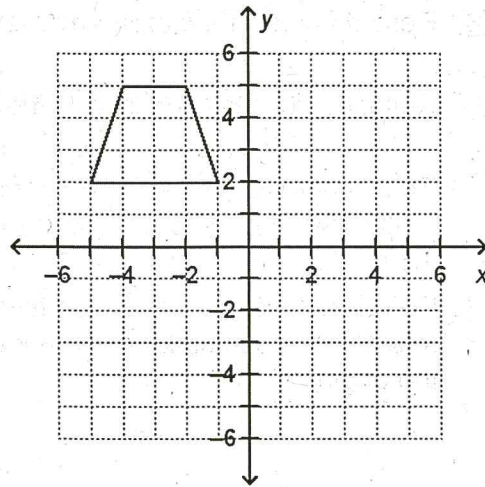
- Ⓐ Reflect across the x -axis, and then rotate 90° counterclockwise about the origin.
- Ⓑ Reflect across the y -axis, and then rotate 90° counterclockwise about the origin.
- Ⓒ Reflect across the x -axis, and then rotate 90° clockwise about the origin.
- Ⓓ Reflect across the y -axis, and then rotate 90° clockwise about the origin.
- Ⓔ Reflect across the x -axis, and then rotate 180° counterclockwise about the origin.
- Ⓕ Reflect across the y -axis, and then rotate 180° counterclockwise about the origin.

CONSTRUCTED RESPONSE

4. Is $\triangle ABC \cong \triangle DEF$? If so, give a sequence of transformations that maps $\triangle ABC$ to $\triangle DEF$. If not, explain.



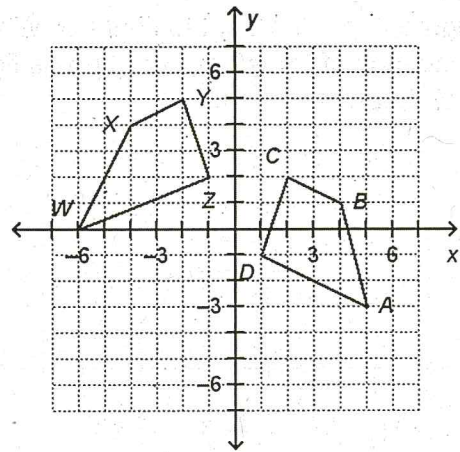
5. Decide if each set of vertices forms a figure that is congruent to the given figure. Use transformations to explain your answers.



- a. $(5, -2), (4, 1), (2, 1), (1, -2)$

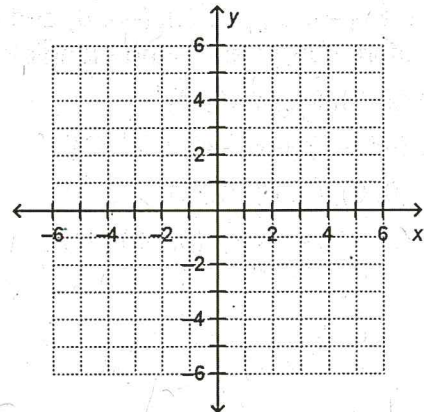
- b. $(4, 1), (3, 4), (1, 4), (0, 3)$

6. Are quadrilaterals $ABCD$ and $WXYZ$ congruent? If so, give a sequence of transformations that maps $ABCD$ to $WXYZ$. If not, explain.



7. The vertices of a quadrilateral are $(1, 2), (3, 1), (2, 4),$ and $(5, 3)$. Draw the figure on the coordinate plane. Perform the following transformations, where each transformation is applied to the previous image. Draw each image on the coordinate plane, keeping track of which transformation was performed. Are the original figure and final image congruent? Explain.

- a. $(x, y) \rightarrow (x - 3, y + 1)$
- b. $(x, y) \rightarrow (-y, x)$
- c. $(x, y) \rightarrow (-x, y)$

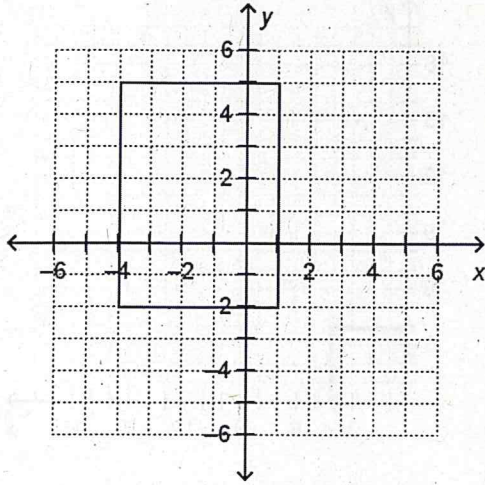


8.G.3

SELECTED RESPONSE

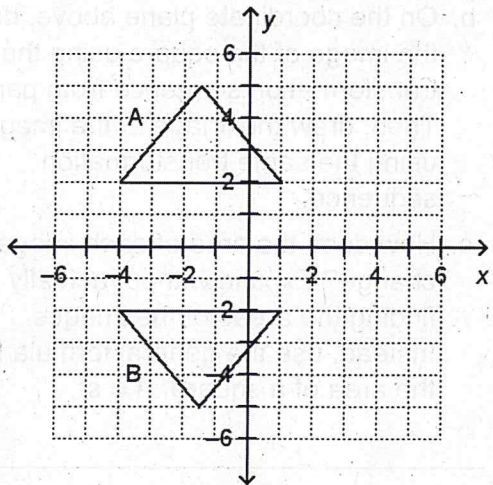
Select all correct answers.

1. The rectangle shown is translated 6 units to the left. Which ordered pair is NOT a vertex of the image?



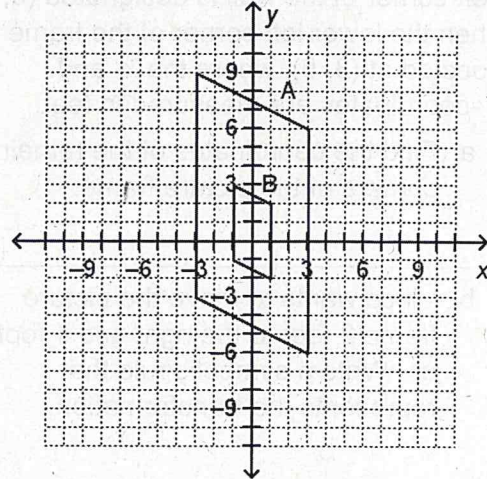
- (A) (2, -2)
- (B) (-10, 5)
- (C) (-5, -2)
- (D) (-5, 5)

2. Figure B is the image of figure A under what transformation?



- (A) $(x, y) \rightarrow (x, y - 4)$
- (B) $(x, y) \rightarrow (-x, y)$
- (C) $(x, y) \rightarrow (x, -y)$
- (D) $(x, y) \rightarrow (x, y - 7)$

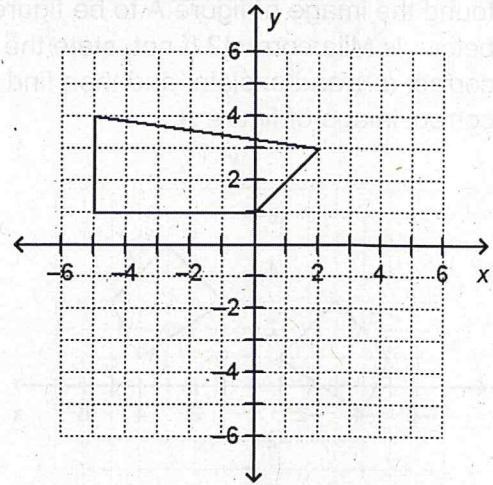
3. Figure B is the image of figure A after a dilation centered at the origin. What is the scale factor of the dilation?



- (A) $\frac{1}{3}$
- (B) $\frac{1}{2}$
- (C) 1
- (D) 3

Select all correct answers.

4. The figure shown is rotated 180° clockwise about the origin. Which ordered pairs are the vertices of the image?



- (A) (5, -4)
- (B) (5, -1)
- (C) (1, 5)
- (D) (0, -1)
- (E) (3, -2)
- (F) (-2, -3)

CONSTRUCTED RESPONSE

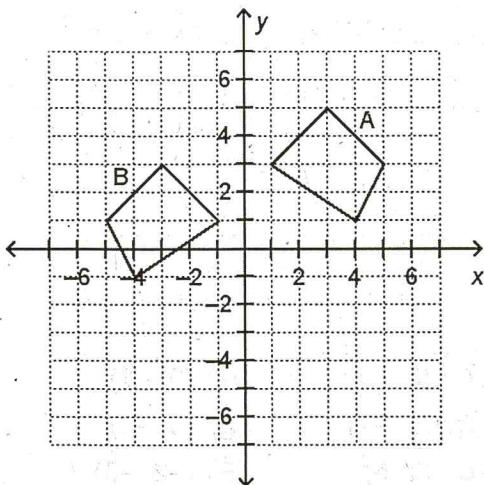
5. Vince is moving a rectangular picture frame on a wall. The picture frame is 2 feet long and 1 foot tall. If the bottom left corner of the wall is designated (0, 0), then the lower left corner of the frame is located at (3, 5), where the x- and y-coordinates are measured in feet.

a. Find the coordinates of the remaining corners of the picture frame.

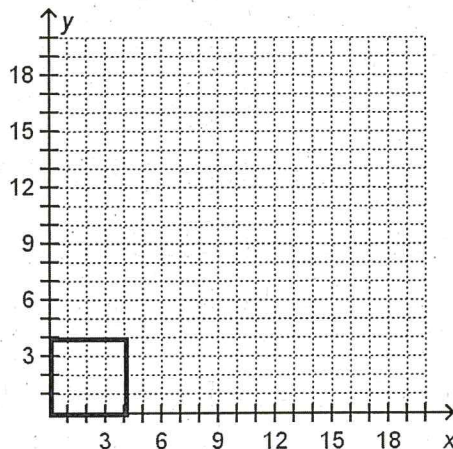
b. Vince wants to move the picture frame 2 feet to the right and 1 foot up. Write a symbolic rule that represents the transformation.

c. Find the coordinates of each corner of the frame after Vince moves the frame.

6. Mila claims that the image of a figure reflected across the x-axis and translated 2 units down is given by the rule $(x, y) \rightarrow (-x, y - 2)$. Using this rule, Mila found the image of figure A to be figure B below. Is Mila correct? If not, state the correct rule and explain, and then find the correct image of figure A.



7. Rosa is making a pattern using the square with side length 4 units shown below. The square undergoes a dilation with a scale factor of $\frac{3}{2}$ centered at the origin, followed by a translation 4 units up and 4 units right.



a. Write symbolic rules for the two transformations that Rosa uses to create her pattern using the given square.

b. On the coordinate plane above, draw the image of the square using the transformation sequence from part a. Then, draw the image of the image using the same transformation sequence.

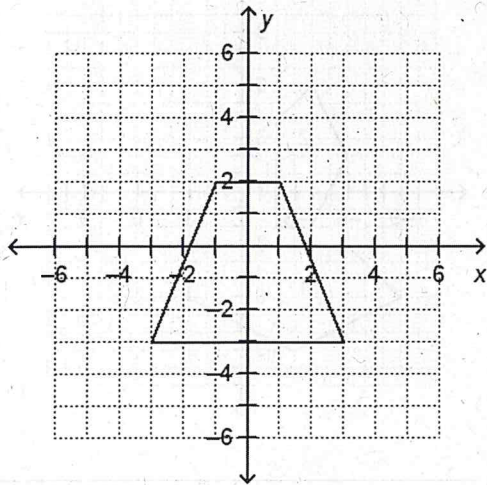
c. How does the area of each image change? Explain without actually finding the areas of the images. Instead, use the general formula for the area of a square, $A = s^2$.

8.G.4

SELECTED RESPONSE

Select the correct answer.

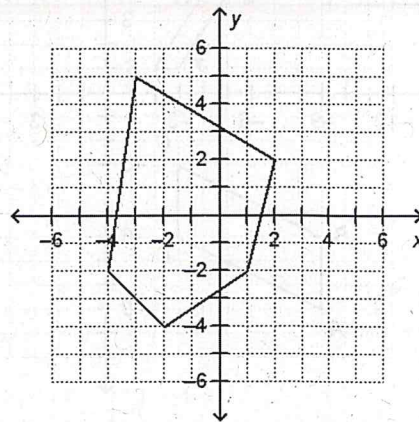
1. Which set of vertices forms a figure that is similar but NOT congruent to the figure shown?



- (A) $(-3, 3), (2, 1), (2, -1), (-3, -3)$
- (B) $(-6, -6), (-2, 4), (2, 4), (6, -6)$
- (C) $(-2, -6), (0, -1), (2, -1), (4, -6)$
- (D) $(-3, 3), (-1, -2), (1, -2), (3, 3)$

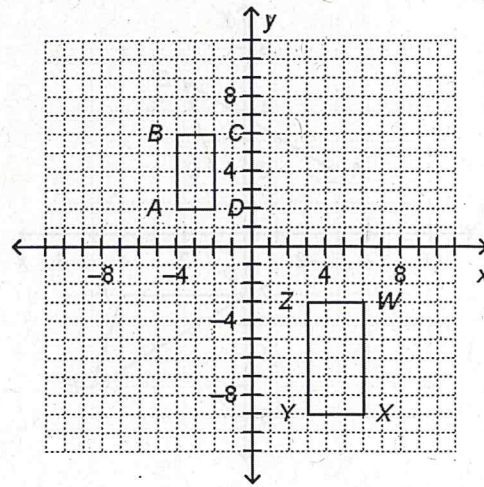
Select the correct answer for each lettered part.

3. Identify which sequences of transformations performed on the figure shown result in a similar but NOT congruent figure or a similar and congruent figure.



- a. $(x, y) \rightarrow (x - 3, y + 8)$ followed by $(x, y) \rightarrow (y, -x)$
- b. $(x, y) \rightarrow (-x, y)$ followed by $(x, y) \rightarrow (5x, 5y)$
- c. $(x, y) \rightarrow (x, -y)$ followed by $(x, y) \rightarrow (x - 3, y)$
- d. $(x, y) \rightarrow (0.1x, 0.1y)$ followed by $(x, y) \rightarrow (-y, x)$

2. Which sequence of transformations maps rectangle $ABCD$ to rectangle $WXYZ$ and shows that $ABCD \sim WXYZ$?

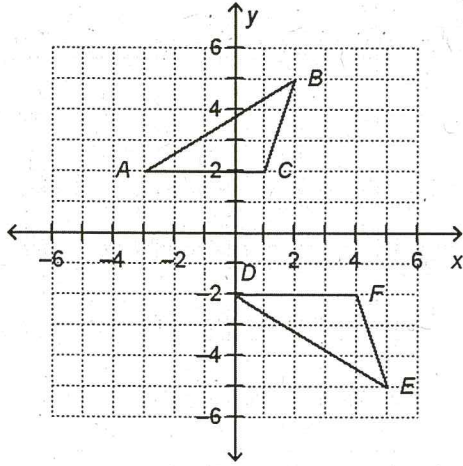


- (A) $(x, y) \rightarrow (x + 4, y - 4)$ followed by $(x, y) \rightarrow (1.5x, 1.5y)$
- (B) $(x, y) \rightarrow (1.5x + 1.5y)$ followed by $(x, y) \rightarrow (x + 9, y - 6)$
- (C) $(x, y) \rightarrow (-x, -y)$ followed by $(x, y) \rightarrow (1.5x, 1.5y)$
- (D) $(x, y) \rightarrow (1.5x, 1.5y)$ followed by $(x, y) \rightarrow (-x, y)$

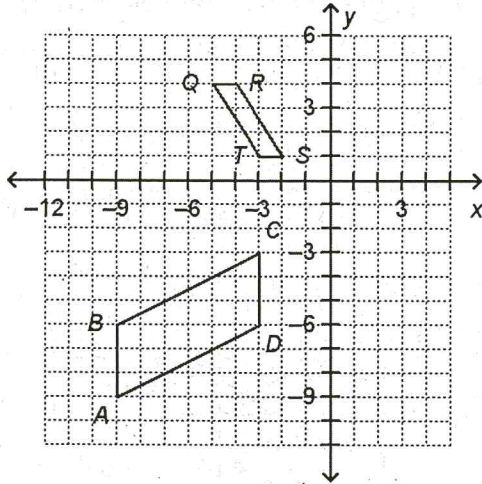
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CONSTRUCTED RESPONSE

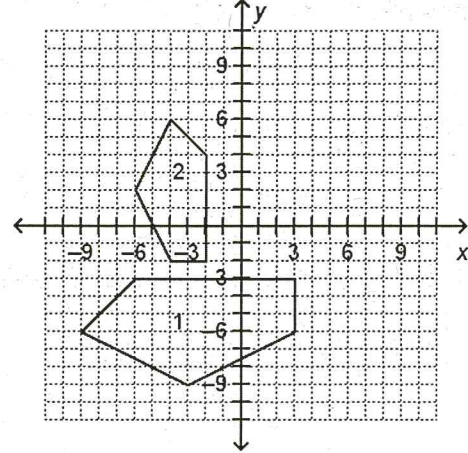
4. Is $\triangle ABC \sim \triangle DEF$? If so, give a sequence of transformations that maps $\triangle ABC$ to $\triangle DEF$. If not, explain.



5. $ABCD$ and $QRST$ are parallelograms. Is $ABCD \sim QRST$? Explain.



6. Callie claims that figure 1 and figure 2 are neither congruent nor similar. Is Callie's claim correct? If so, explain. If not, find a sequence of transformations that maps figure 1 to figure 2 and shows that they are congruent, similar, or both.



7. a. Figure A and figure B are similar. Figure B is the image of figure A after a dilation with respect to the origin by a scale factor of k followed by a reflection across the x -axis. Prove that these transformations can also be done in the reverse order to map figure A to figure B.

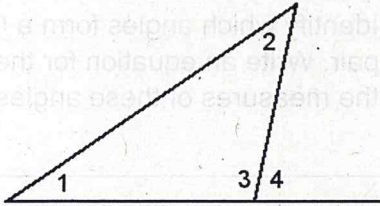
- b. Figure C and figure D are similar. Figure D is the image of figure C after a dilation with respect to the origin by a scale factor of k followed by a translation right a units. Prove that these transformations must be done in this particular order to map figure C to figure D.

8.G.5

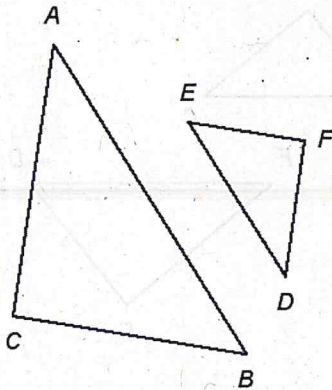
SELECTED RESPONSE

Select the correct answer.

1. In the triangle, $m\angle 1 = 42^\circ$ and $m\angle 4 = 81^\circ$. What is $m\angle 2$?



- (A) 39°
 - (B) 42°
 - (C) 99°
 - (D) 123°
2. Which of the following guarantees that $\triangle ABC$ and $\triangle DEF$ are similar triangles?



- (A) $\angle B \cong \angle E$, and $\overline{BC} \cong \overline{EF}$
 - (B) $\angle C \cong \angle F$, and $\overline{AC} \cong \overline{DF}$
 - (C) $\angle B \cong \angle E$, and $\angle C \cong \angle F$
 - (D) $\overline{BC} \cong \overline{EF}$, and $\overline{AC} \cong \overline{DF}$
3. Which set of angles does NOT form a triangle?
- (A) 85° , 43° , and 52°
 - (B) 90° , 37° , and 51°
 - (C) 37° , 65° , and 78°
 - (D) 120° , 12° , and 48°

4. $\triangle ABC$ and $\triangle DEF$ are similar triangles. If $m\angle A = 104^\circ$ and $m\angle E = 36^\circ$, what is $m\angle C$?

- (A) 36°
- (B) 40°
- (C) 76°
- (D) 104°

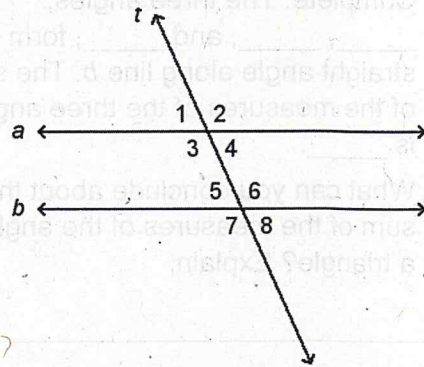
Select all correct answers.

5. Suppose two parallel lines are cut by a transversal. What angle relationships describe congruent angles in this context?

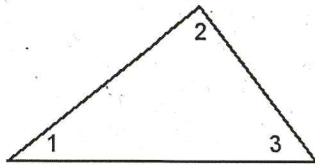
- (A) Corresponding angles
- (B) Linear pair
- (C) Same-side interior angles
- (D) Same-side exterior angles
- (E) Alternate exterior angles
- (F) Alternate interior angles

CONSTRUCTED RESPONSE

6. Parallel lines a and b are cut by the transversal t . Explain how transformations can be used to show that $\angle 4 \cong \angle 8$ and $\angle 4 \cong \angle 5$.



7. Use the figure shown to complete parts a through e, which constitute a proof of the triangle sum theorem.

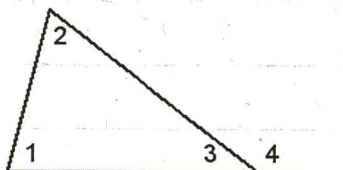


- Draw line a through the base of the triangle. Draw line b through the vertex opposite the base and parallel to line a .
- Extend the other two sides of the triangle in both directions. Label the left line t and the right line s . These two lines intersect the parallel lines a and b and are called _____.
- Two acute angles adjacent to $\angle 2$ are formed by lines t , s , and b . Label the left angle $\angle 4$ and the right angle $\angle 5$. Complete the following statements:

$\angle 1$ and _____ are one pair of alternate interior angles; $\angle 3$ and _____ are another pair of alternate interior angles. The angles in each pair of alternate interior angles are _____.

- Complete: The three angles, _____, _____, and _____, form a straight angle along line b . The sum of the measures of the three angles is _____.
- What can you conclude about the sum of the measures of the angles of a triangle? Explain.

8. Use the triangle below to complete parts a through d, which constitute a proof of the exterior angle theorem.



- Identify the exterior angle and the remote interior angles.

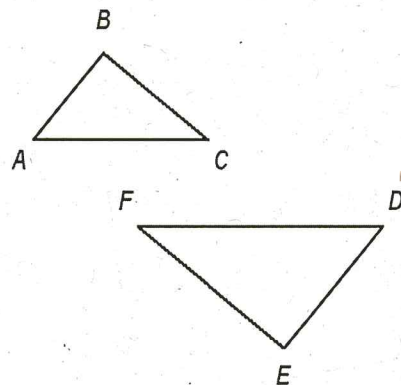
- Complete using the triangle sum

theorem: _____ + _____ + _____ = 180° .

- Identify which angles form a linear pair. Write an equation for the sum of the measures of these angles.

- What can you conclude about the measures of an exterior angle and its remote interior angles? Justify your conclusion by using the information from parts a through c.

9. In the triangles below, $\angle A \cong \angle D$ and $\angle B \cong \angle E$.



- What can you conclude about $\angle C$ and $\angle F$? Explain.

- Can you conclude that $\triangle ABC$ and $\triangle DEF$ are similar? Explain your reasoning without using the angle-angle similarity criterion.

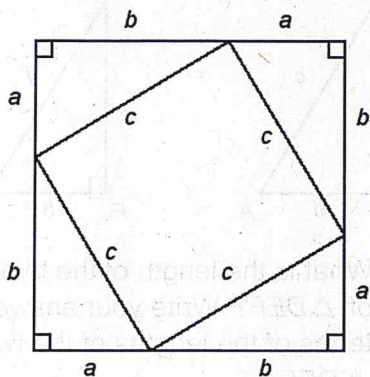
- Can you conclude that $\triangle ABC$ and $\triangle DEF$ are congruent? Explain your reasoning.

8.G.6

SELECTED RESPONSE

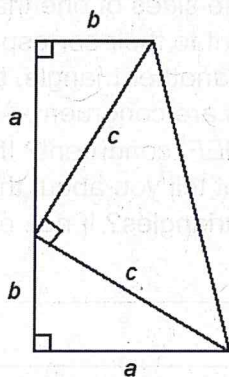
Select the correct answer.

1. The diagram below is used to prove the Pythagorean theorem. What expression represents the length of a side of the larger square in the diagram?



- (A) c
- (B) $a + b$
- (C) $a - b$
- (D) $b - a$

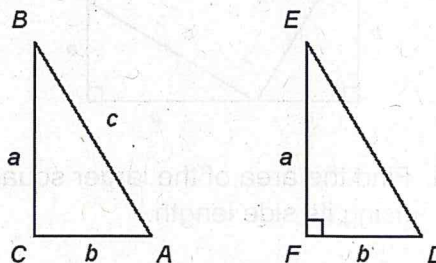
2. The diagram below is used to prove the Pythagorean theorem. What is the area of the trapezoid in the diagram?



- (A) $\frac{1}{2}(a+b)(b+c)$
- (B) $\frac{1}{2}(a-b)(a+b)$
- (C) $(a+b)^2$
- (D) $\frac{1}{2}(a+b)^2$

3. Suppose you know the following facts about $\triangle ABC$ and $\triangle DEF$:
- (1) Both triangles have sides of length a and b .
 - (2) For $\triangle ABC$, $a^2 + b^2 = c^2$.
 - (3) For $\triangle DEF$, $\angle F$ is a right angle.

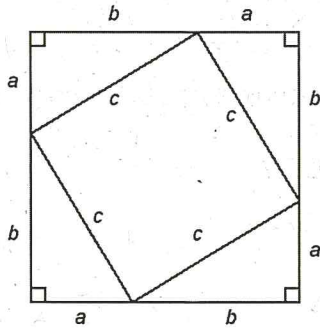
What can be said about the value of c in $\triangle ABC$ and the length of the hypotenuse of $\triangle DEF$?



- (A) The value of c in $\triangle ABC$ is $\sqrt{a^2 + b^2}$, and the length of the hypotenuse of $\triangle DEF$ is $a^2 + b^2$.
- (B) The value of c in $\triangle ABC$ is $a^2 + b^2$, and the length of the hypotenuse of $\triangle DEF$ is $\sqrt{a^2 + b^2}$.
- (C) The value of c in $\triangle ABC$ is $\sqrt{a^2 + b^2}$, and the length of the hypotenuse of $\triangle DEF$ is $\sqrt{a^2 + b^2}$.
- (D) The value of c in $\triangle ABC$ is $a^2 + b^2$, and the length of the hypotenuse of $\triangle DEF$ is $a^2 + b^2$.

CONSTRUCTED RESPONSE

4. A square is decomposed into four congruent right triangles and one smaller square as shown. Use the diagram to complete parts a–c, which constitute a proof of the Pythagorean theorem.

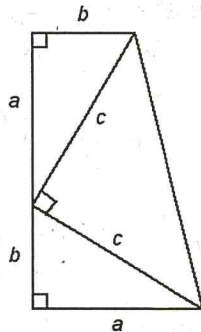


- a. Find the area of the larger square using its side length.

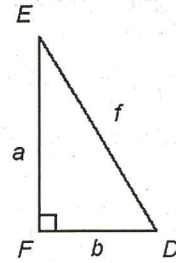
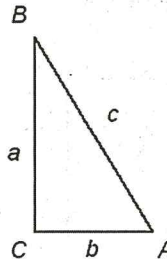
- b. Find the combined area of the four triangles and the smaller square.

- c. Set the expressions from parts a and b equal to each other. Simplify.

5. Three right triangles are arranged to form a trapezoid as shown. Use the area of the trapezoid and the combined area of the triangles to prove the Pythagorean theorem.



6. Suppose that for $\triangle ABC$ shown below, $a^2 + b^2 = c^2$. Also shown is $\triangle DEF$, which is a right triangle whose two legs have lengths a and b and whose hypotenuse has length f . Prove the converse of the Pythagorean theorem by completing parts a–d.



- a. What is the length of the hypotenuse of $\triangle DEF$? Write your answer in terms of the lengths of the two legs of $\triangle DEF$.

- b. What can you say about the side of length c in $\triangle ABC$ and the hypotenuse of $\triangle DEF$? Explain.

- c. If all three sides of one triangle are congruent to their corresponding sides in another triangle, then the triangles are congruent. Are $\triangle ABC$ and $\triangle DEF$ congruent? If so, what does that tell you about the angles of the two triangles? If not, explain.

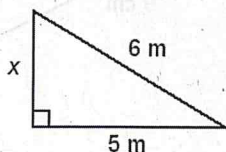
- d. What can you conclude about $\triangle ABC$? Explain.

8.G.7

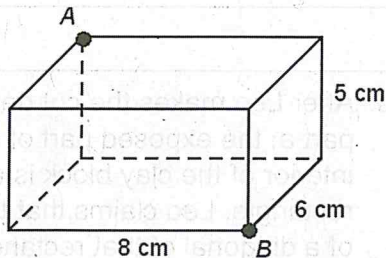
SELECTED RESPONSE

Select the correct answer.

1. What is the unknown side length, to the nearest tenth of a meter, in the triangle shown?



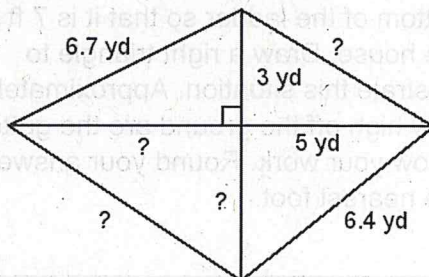
- (A) 1.0 m
 - (B) 3.3 m
 - (C) 7.8 m
 - (D) 11.0 m
2. The size of a computer screen is measured along the diagonal. What is the approximate size, measured to the nearest inch, of a 12 in. by 10.5 in. computer screen?
- (A) 6 in.
 - (B) 16 in.
 - (C) 23 in.
 - (D) 254 in.
3. What is the approximate length of the diagonal from point A to point B in the right rectangular prism shown? Round your answer to the nearest centimeter.



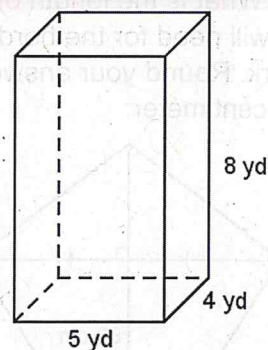
- (A) 8 cm
- (B) 9 cm
- (C) 10 cm
- (D) 11 cm

Select all correct answers.

4. Which measurements, rounded to the nearest tenth of a yard, are the unknown lengths in the figure shown?



- (A) 4.0 yd
 - (B) 5.8 yd
 - (C) 6.0 yd
 - (D) 7.2 yd
 - (E) 7.3 yd
 - (F) 8.1 yd
5. Which measurements, rounded to the nearest tenth of a yard, are the lengths of a diagonal of the right rectangular prism or any diagonal of a face of the prism?

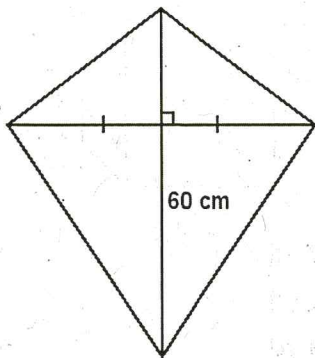


- (A) 6.2 yd
- (B) 6.4 yd
- (C) 8.9 yd
- (D) 9.4 yd
- (E) 10.2 yd
- (F) 12.0 yd

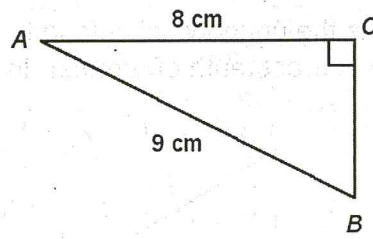
CONSTRUCTED RESPONSE

6. Maurice is cleaning out the rain gutters on his house. To get to the gutters, he places a 24 ft ladder against the house so that the top of the ladder reaches the bottom of the gutters. He places the bottom of the ladder so that it is 7 ft from the house. Draw a right triangle to illustrate this situation. Approximately how high off the ground are the gutters? Show your work. Round your answer to the nearest foot.

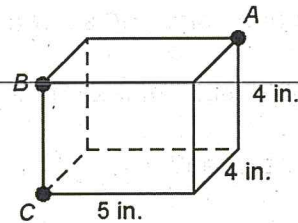
7. Manuel is making a kite. He cuts out a piece of cloth in the shape shown. He uses two sticks as supports. The vertical stick is 90 cm long, and the horizontal stick is 80 cm long. They intersect at a right angle 60 cm from the bottom of the vertical stick. The vertical stick bisects the horizontal stick, as shown. Manuel wants to add a border around the perimeter of the kite. What is the length of material Manuel will need for the border? Show your work. Round your answer to the nearest centimeter.



8. What is the approximate area of $\triangle ABC$? Show your work. Round your answer to the nearest tenth of a square centimeter.



9. Leo is cutting a clay block in the shape of a right rectangular prism. The dimensions of the block are shown.



a. Leo claims that if he cuts vertically downward between points A and B, the approximate length of the cut from point A to point B, rounded to the nearest inch, is 6 in. Is Leo correct? Explain. If he is not correct, find the correct approximate length.

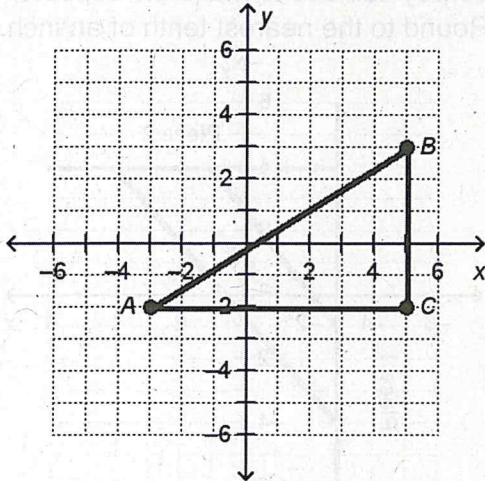
b. After Leo makes the cut described in part a, the exposed part of the interior of the clay block is a rectangle. Leo claims that the length of a diagonal of that rectangle, rounded to the nearest inch, is 7 in. Is Leo correct? Explain. If he is not correct, find the correct approximate length.

8.G.8

SELECTED RESPONSE

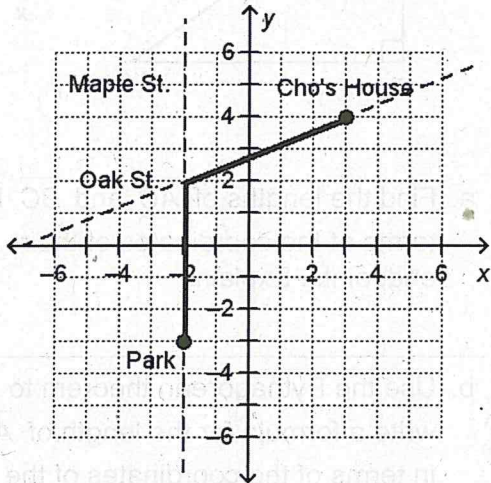
Select the correct answer.

1. Find the length of \overline{AB} in $\triangle ABC$ shown on the coordinate plane. Round to the nearest unit.



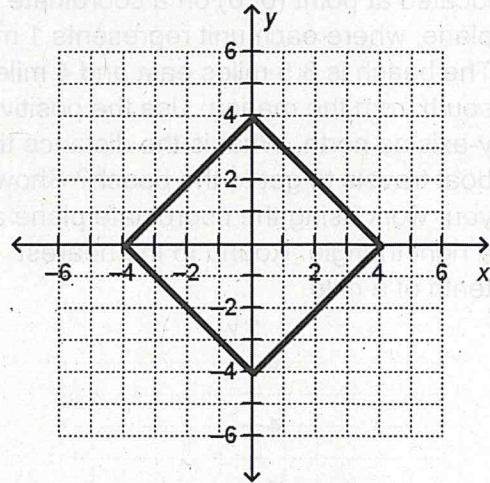
- (A) 5 (C) 9
(B) 8 (D) 13

2. Every morning, Cho rides his bicycle from his house to the park and then back to his house. He takes the same route in both directions. His route is shown on the coordinate plane, where each unit represents 1 mile. How far does Cho ride every morning? Round to the nearest tenth of a mile.



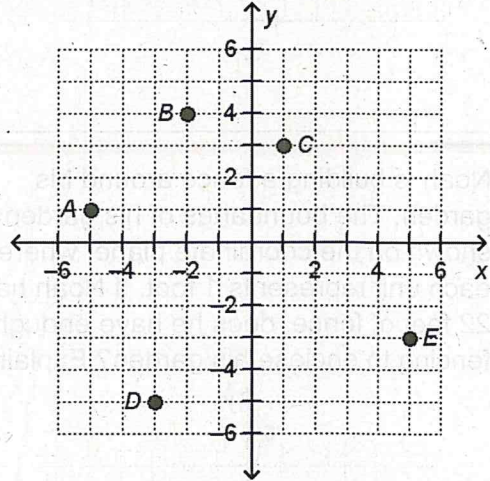
- (A) 5.0 miles (C) 10.4 miles
(B) 5.4 miles (D) 20.8 miles

3. Find the perimeter of the square shown. Round to the nearest tenth.



- (A) 5.7 (C) 22.6
(B) 16.0 (D) 32.0

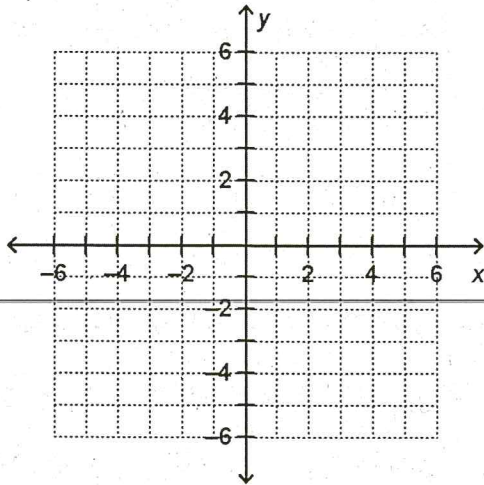
Use the coordinate plane to match each segment with its corresponding length rounded to the nearest tenth.



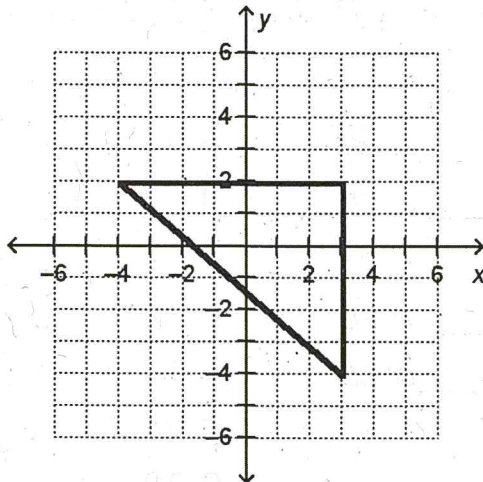
- | | |
|------------------------|--------|
| ___ 4. \overline{AB} | A 3.2 |
| ___ 5. \overline{CE} | B 4.2 |
| ___ 6. \overline{BE} | C 7.2 |
| ___ 7. \overline{BD} | D 8.2 |
| ___ 8. \overline{CD} | E 8.9 |
| | F 9.1 |
| | G 9.9 |
| | H 10.8 |

CONSTRUCTED RESPONSE

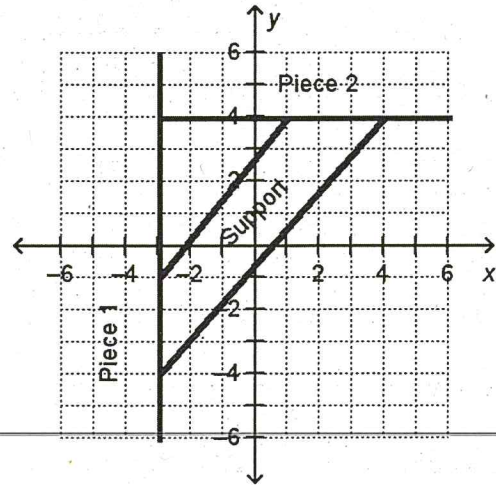
9. A boat travels a straight route from the marina to the beach. The marina is located at point $(0, 0)$ on a coordinate plane, where each unit represents 1 mile. The beach is 3.5 miles east and 4 miles south from the marina. Use the positive y -axis as north. What is the distance the boat travels to get to the beach? Show your work using the coordinate plane and a right triangle. Round to the nearest tenth of a mile.



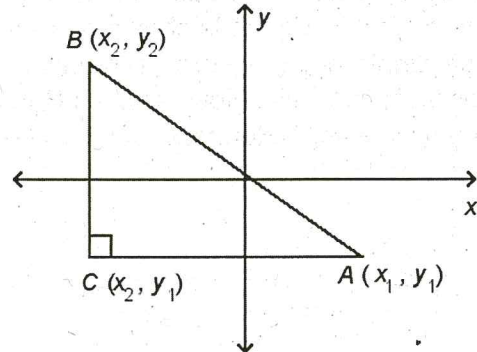
10. Noah is building a fence around his garden. The boundaries of his garden are shown on the coordinate plane, where each unit represents 1 foot. If Noah has 22 feet of fence, does he have enough fencing to enclose his garden? Explain.



11. Jeffrey is making a new post for his mail box using three pieces of wood. Two of the pieces will form a right angle. The third piece will be used as a support for the mailbox, as shown on the coordinate plane below. If each unit represents 1 inch, what is the shortest piece of wood Jeffrey can use to make the support? Round to the nearest tenth of an inch.



12. The endpoints of $\triangle ABC$ are located at $A(x_1, y_1)$, $B(x_2, y_2)$, and $C(x_2, y_1)$.



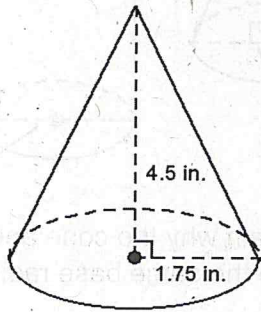
- a. Find the lengths of \overline{AC} and \overline{BC} in terms of the coordinates of their endpoints. Explain.
- b. Use the Pythagorean theorem to write a formula for the length of \overline{AB} in terms of the coordinates of the endpoints of \overline{AC} and \overline{BC} .

8.G.9

SELECTED RESPONSE

Select the correct answer.

1. What is the volume of the cone with the given dimensions? Use 3.14 for π . Round your answer to the nearest tenth of a cubic inch.



- (A) 8.25 in³ (C) 43.3 in³
 (B) 14.4 in³ (D) 57.7 in³
2. What is the formula for the volume of a sphere with diameter d ?

(A) $V = \frac{1}{3}\pi\left(\frac{d}{2}\right)^3$

(B) $V = 4\pi d^3$

(C) $V = \frac{4}{3}\pi\left(\frac{d}{2}\right)^3$

(D) $V = \frac{4}{3}\pi d^3$

3. What is the ratio of the volumes of a cylinder and a cone having the same base radius r and height h ?
- (A) The volume of a cone is 3 times the volume of a cylinder.
 (B) The volume of a cylinder is 3 times the volume of a cone.
 (C) The volume of a cylinder is $\frac{1}{3}$ times the volume of a cone.
 (D) The volumes of a cylinder and a cone are equal.

4. A cylindrical soup can has a height of $3\frac{1}{2}$ in. and a diameter of $2\frac{1}{8}$ in. What is the volume of the soup can? Use 3.14 for π . Round to the nearest tenth of a cubic inch.

(A) 4.1 in³

(B) 12.4 in³

(C) 23.4 in³

(D) 49.6 in³

5. A ball has a radius of 8 cm. What is the volume of the ball? Use 3.14 for π . Round to the nearest tenth of a cubic centimeter.

(A) 267.9 cm³

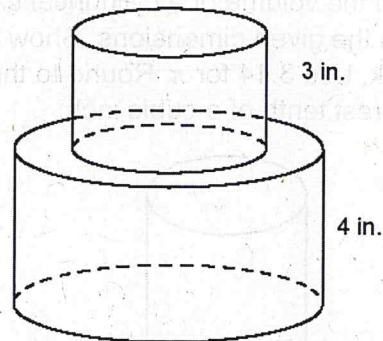
(B) 535.9 cm³

(C) 1,607.7 cm³

(D) 2,143.6 cm³

Select all correct answers.

6. Stefan is making a two-tier cake in the shape shown. The diameter of the bottom cylindrical tier is 8 in., and the diameter of the top cylindrical tier is 5 in. Which measurements are the volumes of each tier and the entire cake? Use 3.14 for π . Round to the nearest cubic inch.



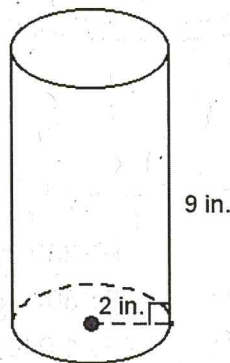
- (A) 59 in³ (D) 260 in³
 (B) 201 in³ (E) 804 in³
 (C) 236 in³ (F) 1,040 in³

CONSTRUCTED RESPONSE

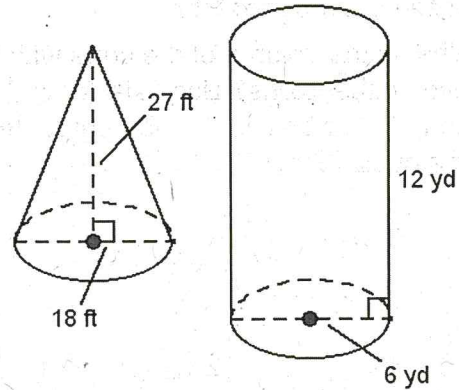
7. The radius of a softball is 3.75 cm, and the radius of a table tennis ball is 2 cm. The volume of the softball is how many times greater than the volume of the table tennis ball? Show your work using ratios. Use 3.14 for π . Round to the nearest tenth.
-
8. Tyler's basketball team just won the state championship. The trophy is a silver basketball sitting on top of a cylindrical wooden base. The basketball has a radius of 2.35 in. The base has a radius equal to that of the basketball and a height of 2 in. Find the total volume of the trophy. Show your work. Use 3.14 for π . Round to the nearest tenth of a cubic inch.
-

9. The sharpened end of a round pencil has a height of 15 mm and a base diameter of 5 mm. The rest of the pencil has a height of 175 mm. What is the total volume of the pencil? Show your work. Use 3.14 for π .
-

10. Find the volume of a cylindrical candle with the given dimensions. Show your work. Use 3.14 for π . Round to the nearest tenth of a cubic inch.



11. A cone and a cylinder have the given dimensions. Assume the cone is placed inside the cylinder.



- a. Explain why the cone and cylinder have the same base radius.
-
-

- b. Find a general formula to find the remaining volume of the cylinder when the cone has base radius r and height h_1 , the cylinder has radius r and height h_2 , and r , h_1 , and h_2 are measured in the same units.
-
-

- c. Use your formula from part b to calculate the remaining volume for the cone and cylinder shown. Show your work. Use 3.14 for π .
-
-

- d. Discuss how your formula from part b changes if the cone and the cylinder have the same base radius and the same height. What do you notice about the remaining volume of the cylinder?
-
-